

AD-A168 385 IMPACT OF A HEALTH AND PHYSICAL READINESS PROGRAM ON  
NAVAL AIR STATION PRODUCTIVITY(U) NAVAL POSTGRADUATE  
SCHOOL MONTEREY CA J A HEFLIN MAR 86

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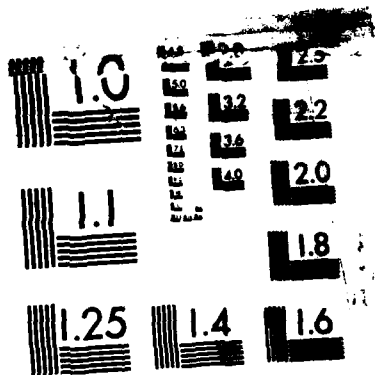
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# NAVAL POSTGRADUATE SCHOOL

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## THESIS

IMPACT OF A HEALTH AND PHYSICAL  
READINESS PROGRAM ON NAVAL  
AIR STATION PRODUCTIVITY

by

Joyce Ann Heflin

March 1986

Thesis Advisor:

Douglas E. Neil

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Impact of a Health and Physical Readiness Program  
on Naval Air Station Productivity

by

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Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT


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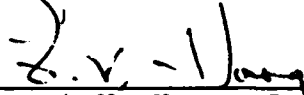
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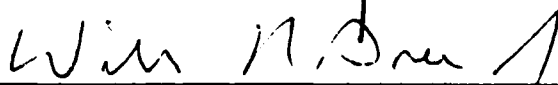
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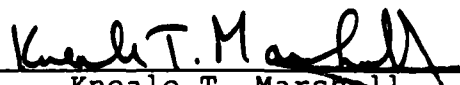
  
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## ABSTRACT

This investigation examined the impact of a Health and Physical Readiness Program on Naval Air Station productivity from January 1983 to June 1984 at Pensacola, Florida. Overall scores on the Navy Health and Physical Readiness Test were compared with Aircraft Maintenance Data and Medical Morbidity Reports. Results indicate a dramatic improvement in overall Health and Physical Readiness scores. A significant decrease in the maintenance manhours and repair turnaround time was noted for a constant output of items processed. Medical data revealed significant reductions in injuries, motor vehicle accidents, circulatory diseases, alcoholic treatments and weight control cases. Allowing for the dynamic leadership provided by the Commanding Officer and Executive Officer to the Naval Air Station, it still appears that the Health and Physical Readiness Program had a positive impact on Naval Air Station productivity.

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## I. INTRODUCTION

Exercise has long been heralded as an essential tool in health promotion (Pauly, Palmer, Wright & Pfeiffer, 1982). Stromme et al. (1982) state that health is not something one receives, but something one must work for and strive towards. Stromme continues by saying that many individuals can improve their functional condition through physical activity and therefore improve their total life situation. The importance of the exercise and health connection becomes all too clear when health care is noted as the second leading cost, after salaries, for most industries (Barnes, 1983).

The number of employee fitness/lifestyle programs has increased significantly over the past ten years, despite a largely unsubstantiated cost rationale for such programs (Cox, 1984). Shephard (1983) points out that companies notice a positive change in worker performance for a moderate financial outlay on physical fitness programs. The key issue for companies evaluating their physical fitness investment is that the programs are considered to be effective in cost containment because so many individuals believe that they are (Wright, 1982). Companies who have taken the initiative in providing a physical fitness program feel that the investment was a wise one due to increased productivity, better morale, fewer turnovers and lower

sickness and absentee rates (Goldberg, 1978). Although there are many statements to the effect that a healthier executive is a more effective employee who contributes more when they are on the job (Fielding, 1982), the translation of physical fitness to job performance has not been well studied.

Unlike corporate America, the Navy has the ability to mandate adherence and participation in a fitness program. It seems a most logical assumption that the demands of the Navy life would require attention to physical fitness issues. In October 1982, the Navy introduced its new Health and Physical Readiness Program (HPRP). With this new program, the Navy was finally ready to give more than lip service to health and physical fitness issues. Health and Physical Readiness was more than a new name for an old program. Finally there was a program with standards of performance to govern all naval personnel and the teeth to enforce those standards. For the first time in the history of naval fitness programs, the office that drafted the governing instruction was not abolished when the instruction hit the street.

The HPRP put the Navy in step with corporate America where health and physical fitness was becoming big business. Like corporate America, the Navy was ready to invest in its most important resource: their employees. The bottom line behind this investment strategy was to reduce costs and

increase productivity. The costs associated with a HPRP were small. There were limited needs for administrative support and a minor supply and equipment requirement. The biggest cost to account for was the time of the people involved. It took time for a Command Fitness Coordinator to organize, plan and execute the program. It took time for people to participate in the program. The question remaining for the Navy to answer at the bottom line was what they could expect in return for this investment of time.

#### A. STATEMENT OF THE PROBLEM

The purpose of this study is to determine the impact of a Health and Physical Readiness Program on Naval Air Station productivity.

#### B. SUBPROBLEMS

The organization of this study required the consideration of the following subproblems:

1. To define and measure Naval Air Station Pensacola productivity.
2. To interview the Commanding Officer and Executive Officer of the Naval Air Station Pensacola concerning their perceptions of the HPRP and productivity.
3. To evaluate the relationship between productivity and fitness.
4. To account for factors other than HPRP that may have impacted productivity measures.

#### C. BASIC ASSUMPTIONS

This study was undertaken with the following assumptions:

1. Health and Physical Readiness test scores represent



general fitness measures.

2. The HPRP at NAS Pensacola was recognized by NMPC-6H as a model program to be emulated by other Navy commands.
3. There were no significant changes in NAS Pensacola mission requirements or leadership that might alter productivity measures.
4. All NAS Pensacola personnel were well educated concerning the Health and Physical Readiness Program.

#### D. DEFINITIONS

Definition of the following terms is given to provide a better understanding of the study for the reader:

1. Navy Health and Physical Readiness Program (HPRP):  
(see Appendixes A and B for complete program description)
2. Productivity:
  - \* production or capacity for production yielding favorable or useful results (American Heritage Dictionary, 1982)
  - \* a measure of the relationship between the quantity of goods and services produced during a period of time and the input of labor, capital, and natural resources used in the production process (Levitan & Werneke, 1984)
  - \* Plutchik (1974) states that concepts can be defined by the operations used to measure them.

Productivity is the function of maintenance department output in combination with the incidence of medical morbidity counts and the perceptions of activity held by top management.

#### E. LIMITATIONS

1. Data for fiscal year 1983 and 1984 was difficult to obtain due to limited data retention at the local command.

2. There was a normal turnover of personnel due to retirement, transfer, etc.,
3. The study looked at aggregate measures vice individual case studies.

#### F. SIGNIFICANCE

Corporate America has taken an active interest in the physical condition of their most vital resource: their employees. The private sector has invested tremendous sums of money in health programs and physical fitness facilities. Where profit is the driving motive, corporate America realizes a return on their investment in the form of lower health and insurance costs, less absenteeism and turnover, and increased productivity.

The main significance of this study is that it attempts to quantify the impact of a health and physical readiness program at a Naval Air Station. The literature is rich with references to corporate fitness programs, but there is very little research that has been done on this same topic in the Navy.

In the face of severe budget cuts and restricted operations in all areas, the Navy HPRP, like all military programs, must be ready to justify its existence with facts and figures. These facts and figures must show that the benefits of the program far outweigh the costs. The costs are easily outlined and quantified. The key to the justification hinges on what results can be obtained by providing a HPRP.

## II. REVIEW OF LITERATURE

### A. PHYSICAL FITNESS AND HEALTH

No longer is the connection between physical fitness and health a purely speculative matter. Research efforts from many diverse fields are mounting the evidence that there is a positive relationship between physical fitness and health. Psychologists have found that physical activity often gives an individual a more positive attitude towards their body and a more positive self image (Stromme et al., 1982). Physiologists have found that a wide range of body parameters are improved by physical activity (Yarvote, McDonagh, Goldman & Zuckerman, 1974). Horne (1975) evaluated the effects of a physical activity program over a twenty-four month period and found that subjects in the exercise group have significantly reduced their resting heart rates, systolic blood pressure and serum cholesterol as compared to the control group who did not participate in an exercise program. Physicians have noted that exercise promotes the following specific benefits: increased strength and endurance, improved circulation, improved poise and grace, better muscle tone and posture, decreased chronic tiredness, decreased chronic tension, improved weight control, reduced aches, pains, and stiffness, fewer serious accidents and improved overall appearance (Goldberg, 1978).

Stromme et al. (1982) defines health as a condition of complete physical, mental, and social well-being and not merely the absence of illness or disability. From this perspective, Shephard (1984) demonstrates that it is difficult to dissociate employee fitness from the whole task of occupational health promotion. The focus of the question now becomes whether or not the physically fit employee is of benefit to the economic health of the organization for which they work. Donoghue (1977) found that exercise participants commonly respond that they feel a greater capacity for work, that they can work harder both mentally and physically, and that they feel more energetic and productive.

Coronary disease and its relationship to physical activity has been studied extensively. As early as 1962 it was estimated that the annual costs from lost production due to heart disease were upwards of thirty-two billion dollars (Donoghue, 1977). At the Exxon Physical Fitness Laboratory, Yarvote, McDonagh, Goldman and Zuckerman (1974) state that better physical fitness and the favorable modifications in coronary risk factors should, in theory, lead to less heart disease in employees as well as improve their sense of well-being. Results indicate that a controlled, regularly attended exercise program, completed in a corporate environment, can achieve significant reductions in some coronary risk factors (Horne, 1975).

Fielding (1982) found that the degree of change from a fitness program is directly related to the frequency and intensity of the exercise sessions. Shephard (1974) states that the pattern of exercise needed to improve physical condition is well established: five periods of thirty minutes of endurance activity per week will develop physical condition, while three periods per week are sufficient to maintain that condition.

It is often said that one never truly values their health until they lose it. Without good health, an individual operates below their optimal capacity. Although the jury is still out on all the fine points of the relationship between physical fitness and health, it appears, beyond a shadow of a doubt that the case is being presented to support the crucial linkage of the two.

#### B. CORPORATE FITNESS AND PRODUCTIVITY

Despite the existence of several physical fitness programs in industry, the amount of published material describing their results is minimal (Yarvote et al., 1974). In theory, Shephard (1983) states that employee fitness programs should enhance productivity by increasing the physical relief of boredom and anxiety and an increased vigilance that would reduce accidents. Evaluation of employee fitness programs is difficult due to the following:

1. The goals and objectives of these programs are not stated explicitly.

2. The information to assess whether goals and objectives have been met is often not maintained.
3. There is inadequate evaluation schema to assess whether observed changes can be reasonably attributed to the health promotion program (Fielding, 1982).

Despite all the problems of employee fitness program documentation and justification, corporate America has surged ahead in the provision of health promotion programs. In a recent study of cost containment through health promotion programs, Wright (1982) concluded that the critical justification for physical fitness programs is the informal indicators that program participants, and non-participants, at all levels in the company, honestly believe that these programs are cost-effective in their contribution to employee job satisfaction, company loyalty and productivity. Wright also found that there isn't a great deal of difference between the justification for a medical plan and a physical fitness program because both exist to attract, retain, protect and motivate employees and their families.

Drawing the connection between corporate physical fitness programs and productivity has been an elusive topic at best. Much of the difficulty in making the connection lies in defining and measuring productivity. In the classic economic view, productivity refers to a comparison between the quantity of goods or services produced and the quantity of resources employed in turning out these goods or services (Fabricant, 1969). To say that productivity has become a buzzword in the management literature would

be a mild understatement. Siegal (1980), in contrast to the classic view, states that productivity is an attitude that says all work can be done better by continuous application of creative thinking, problem solving and energetic job performance. Dogramaci (1981) takes a compromise position in stating that performance measures such as personnel turnover, absenteeism, accident rates and grievances are considered productivity criteria as much as such measures as production rate or quality of items produced. There is a wide range of subjective measures of productivity. Fabricant (1969) states that there is no doubt that the amount and kind of food and the conditions of living and working and playing affect the strength, health and stamina of the labor force, but only vague ideas concerning the general rate of improvement in health and its contribution to the rise in productivity are currently understood.

In a pragmatic overview of what management should consider when deciding whether to sponsor a company fitness program, Howard and Mikalachki (1979) provide a model of the relationships between fitness and employee productivity as shown in Figure 1. The model for the long, intermediate and short run evaluation of productivity. Although measurements of employee productivity are often very subjective, absenteeism and turnover are potential yardsticks for objective measurement. It is interesting to note the diverse effects possible over time that are direct and

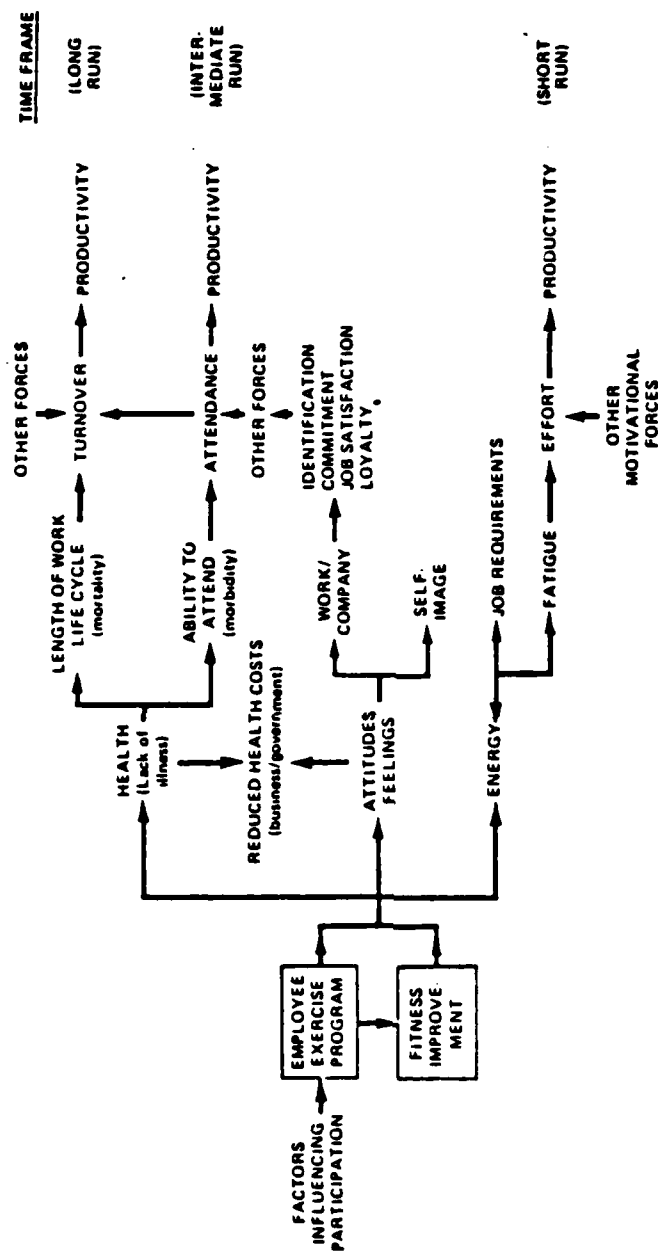


Figure 1 Exercise and Productivity



indirect in nature. Based on the conceptual framework provided by the model, Howard and Mikalachki conclude that:

1. A long term commitment is required for long term influence on productivity factors.
2. Some types of occupations are more likely to benefit from fitness improvement than others.
3. Fitness improvement is likely to significantly reduce absenteeism and turnover.
4. Employees participating in exercise programs will show an enhanced identification with the organization through feeling and attitude improvement.
5. The most likely and measureable effect of employee fitness on productivity is through the effects on employee health (lack of illness) which translates to reduced absenteeism and turnover.

Lastly, companies surveyed by Howard and Mikalachki stated that they anticipated the following payoffs from their fitness programs:

1. better attraction for competent people.
2. improvement in employee morale and loyalty.
3. reflect firm's social responsibility for non-work aspects of its employees' lives.
4. increase employees' fitness which might affect their effort and productivity.

A central issue for corporate fitness programs is the effect on worker performance. Shephard, Cox and Corey (1981) found that self reports and supervisor evaluations showed small and relatively similar gains of productivity in both the test and control companies. They felt that the observed changes probably reflect sample attenuation, seasonal trends and a Hawthorne type effect of response to

the experimental intervention of a non specific nature. Bryson (1970), in Scotland, found that health factors could not be demonstrated as influencing daily output of female production line workers, yet national statistics showed that as the health of the working population in general improved, the overall national economic picture also improved. In evaluating the relationship of job performance to exercise adherence in a corporate fitness program, Bernacki and Baun (1984) found a strong association between above average white collar workers and those who were participating in the fitness program at higher adherence levels. A Canadian study by Cox, Shephard and Corey (1981) found that a 20% participation rate in the fitness program resulted in a 22% reduction in absenteeism. This simple reduction in absenteeism represents a potential for a 1% overall reduction in company payroll. The potential for great cost savings appears to be a simple factor of generating a higher participation rate in the fitness program. Spun, Maksud and Barac-Nieto (1977) show that sugarcane loaders with a lower percent body fat had higher performance ratings in the tonnage of sugarcane moved daily. This indicates a positive relationship between productivity and physical fitness. A study of professorial correlates of physical exercise by Stallings, O'Rourke and Gross (1975) hypothesized that academicians engaging in physical activity would be superior in terms of various professional criteria as compared

to their colleagues who are more sedentary. Their findings indicate that research productivity was not related to yearly caloric expenditure. It should be noted that this study utilized very subjective, self-reported data in questionnaires and phone interviews which often presents a problem of reliability and validity.

Exercise has long been heralded as an essential tool in health promotion. At the Xerox Corporation, Pauly, Palmer, Wright and Pfeiffer (1982) found significant improvements overall in self concept (physical, personal and social), trait anxiety, resting heart rate, systolic blood pressure, total triglycerides, and cholesterol as a result of a fourteen week employee fitness program. Barnes (1983) states that the American Association of Fitness Directors in Business and Industry recognizes that corporate fitness programs are used as executive perks, recruiting enticements, and a means to reduce absenteeism and sick days. For the corporation, the bottom line is that they are able to keep their employees healthier and alive longer. Justification of the corporate employee fitness program in terms of substantial payroll savings would require an increase in the number of adherents to the program and a confirmation of the halo effect suggested by the data (Song, Shephard and Cox, 1982).

### C. NAVY HEALTH AND PHYSICAL READINESS

If the literature concerning corporate fitness and productivity is minimal, there is a tremendous void as one turns their attention to the concepts of health and physical fitness as it applied to military productivity. Levitan and Werneke (1984) point out that the adequacy and usefulness of productivity indicators is limited by the availability of data, and that it is very difficult to measure output in government institutions whose products aren't exchanged in the marketplace.

OPNAV INSTRUCTION 6110.1B (see Appendix A) points out in the background statement that the Navy community is no less susceptible to the effects of a poor lifestyle than the civilian community. The need to maintain a high state of health and physical readiness is essential to ensure combat readiness and personal effectiveness. With this instruction, the Navy makes a move to begin a program that goes beyond physical fitness to encompass health promotion. Similar to corporate America, the Navy is realizing the importance of programs to improve working life and increase motivation for a healthier lifestyle (Cox, 1984). An increased interest in disease prevention and skyrocketing health care costs combined with the aging of the workforce has prompted a serious look at the health and physical readiness issue. Walsh (1983) points out that exercise is undoubtedly an important facet of stress reduction programs.

Due to the inherent stress found in the military, exercise is a critical part of the overall program. Korval, Patton and Vogel (1978) found a significant improvement in mood, anxiety, self confidence and physical fitness of Army male recruits before and after basic training.

Like the corporate fitness program, the Navy Health and Physical Readiness Program must be evaluated by the benefits the Navy receives from its investment. Fielding (1982) notes that a better way to approach the issue of return on investment in fitness programs is to compare the cost with the effects. When asked, "What is it worth to reduce the number of heart attacks per 1000 employees from ten to six?", most companies respond that they feel their interest in the health of their employees justifies whatever investment is needed to achieve that type of reduction. The active, healthy person saves society dollars even during retirement because they realize a longer period of independent living (Shephard, 1983).

The purpose of this review of literature has been to show the relationship between physical fitness and health, and how corporate America is making application of those relationships for improvement and impact on productivity. The Navy has devised and put into operation a health and physical readiness program that is specific in purpose and yet broad in scope. The purpose of this study is to begin to examine the impact this type of program has on Naval Air Station productivity.

### III. METHODOLOGY

The following procedures are designed to measure the impact of a Health and Physical Readiness Program on Naval Air Station productivity.

#### A. SUBJECTS

All officer and enlisted personnel assigned to the Naval Air Station Pensacola Staff between January 1983 and June 1984 served as the population for this study. Personnel from tenant commands were not included in the study.

#### B. DATA COLLECTION

Permission to conduct the study was obtained via phone contact and a written request to Naval Air Station Pensacola (see Appendixes C and D). A visit was made to NAS Pensacola 30 Sep 85 - 4 Oct 85 for the purpose of collecting data for the study. Data contact points were established, and those data items not available at that time were later provided via the mail.

The Commanding Officer, Captain J. B. McKamey, USN, and the Executive Officer, Commander W. R. Logue, USN (Ret.) who were in command from January 1983 to June 1984 were interviewed. The main purpose of the interviews was to gain knowledge about intervening factors that may have skewed productivity data scores. A secondary purpose of the

interviews was to determine why these officers supported the program in the manner in which they did and how they evaluated productivity.

Data was collected from the Health and Physical Readiness Test results for testing conducted in April 1983, October 1983, and April 1984. Maintenance data was collected from the Aircraft Intermediate Maintenance Department 3M System Monthly Summary. The following three variables were selected to represent the productive effort of the maintenance department: items processed, repair turn around time (representing only repair and scheduled repair actions) and total maintenance hours worked. By comparing the turn around time and maintenance hours worked against the items processed, a standard ratio concept approach to productivity could be examined. Medical data was collected from the monthly Medical Services and Outpatient Morbidity Report for the Branch Clinic at the Naval Air Station, Pensacola, Florida. The following variables were examined: outpatient visits, number of personnel assigned to Sick in Quarters (SIQ) status, total number of SIQ days, circulation diseases, motor vehicle accidents, alcoholic treatments, weight control cases, occupational injury and non-occupational injury.

#### C. EXPERIMENTAL DESIGN

The experimental format for this study was a time series design (Tuckman, 1972). The general design can be diagrammed as follows: 01..02..03..X..04..05..06 etc., where the 0

represents an observation and the X represents the experimental intervention. The specific design created for this study can be diagramed as follows:

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*****  
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18  
      X1           X2           X3
```

The eighteen months from January 1983 to June 1984 were represented by 01 through 018. The Health and Physical Readiness Tests were represented by X1, X2, and X3, which correspond to the months April 1983, October 1983, and April 1984. The first six months of 1983 and 1984 are highlighted with the \*\*\*\*\* line. Overall fitness was evaluated at the three X points in time, and comparisons were made between each test cycle. Each maintenance variable and each medical variable was measured at 01 through 018. A time series plot to show patterns over time was plotted for each variable. In order to measure the impact of the fitness program on the maintenance and medical variables, the summation of each variable for the first six months of 1983 was compared to the first six months of 1984.

#### 1. Data Analysis

The Statgraphics (STSC, Inc., 1985) statistical graphics software was utilized for all analysis and graphical presentations. Output was prepared on the IBM Personal Computer with color graphics adaptor, and the Epson dot matrix printer.



Summary statistics and two sample difference between means tests were performed on all variables. Results were presented in graphical form using frequency histograms, hanging histograms, time series plots, and box and whisker plots.

#### IV. RESULTS

The results presented in this section represent data collected from the time period January 1983 through June 1984.

##### A. OVERALL FITNESS

Overall scores on the Health and Physical Readiness Test range from a low of 1, which is a failure, to a high of 5, which is outstanding. All personnel assigned to the Naval Air Station Pensacola were tested in April 1983, October 1983, and April 1984. The April 83 test was the first test given in the new program. Table 1 provides a summary of the scores from the three tests. The mean score increased from a low of 1.78 in April 83 on the first test to 1.93 in October 83 to a high of 2.69 in April 84. Between October 83 and April 84 the median score also increased. Figures 2-7 summarize the distribution of the test scores by category. The histograms in Figures 2, 4, and 6 show the progression of a shift in the distribution from the failure end of the scale toward the more outstanding scores. The hanging histogram figures are very similar to the histogram, with the added dimension of fitting the data to the best-fitting normal distribution. Patterns where the hanging bars vary around the horizontal line above the x axis indicate that the data does not fit a normal distribution. Although the

TABLE 1  
OVERALL FITNESS SUMMARY STATISTICS

	Sample Size	Mean	Var	Std Dev	Median
April 1983	949	1.78	1.41	1.19	2
October 1983	1034	1.93	1.31	1.14	2
April 1984	952	2.69	1.60	1.26	3

number of failures decreases from test to test, the distribution is still heavily weighted toward that end.

In order to answer the question of whether or not the changes in means between the three tests were significant, a two sample analysis for the difference between the means test was performed. Table 2 provides the results from this test. All three test sequence comparisons were significant at the  $\alpha = .05$  confidence level. Figure 8 illustrates the significance of the difference between the means of the April 83 and April 84 test with a box and whisker plot. The central box covers the middle 50% of the data values. The "whiskers" extend out to the extremes, and the central line in the box represents the median. This figure not only points out the dramatic change in the median, but also shows the skewness of the data toward the higher fitness levels as time progresses. These results indicate that the overall fitness level increased significantly from the beginning of the Health and Physical Readiness Program in April 1983 through the April 1984 test.

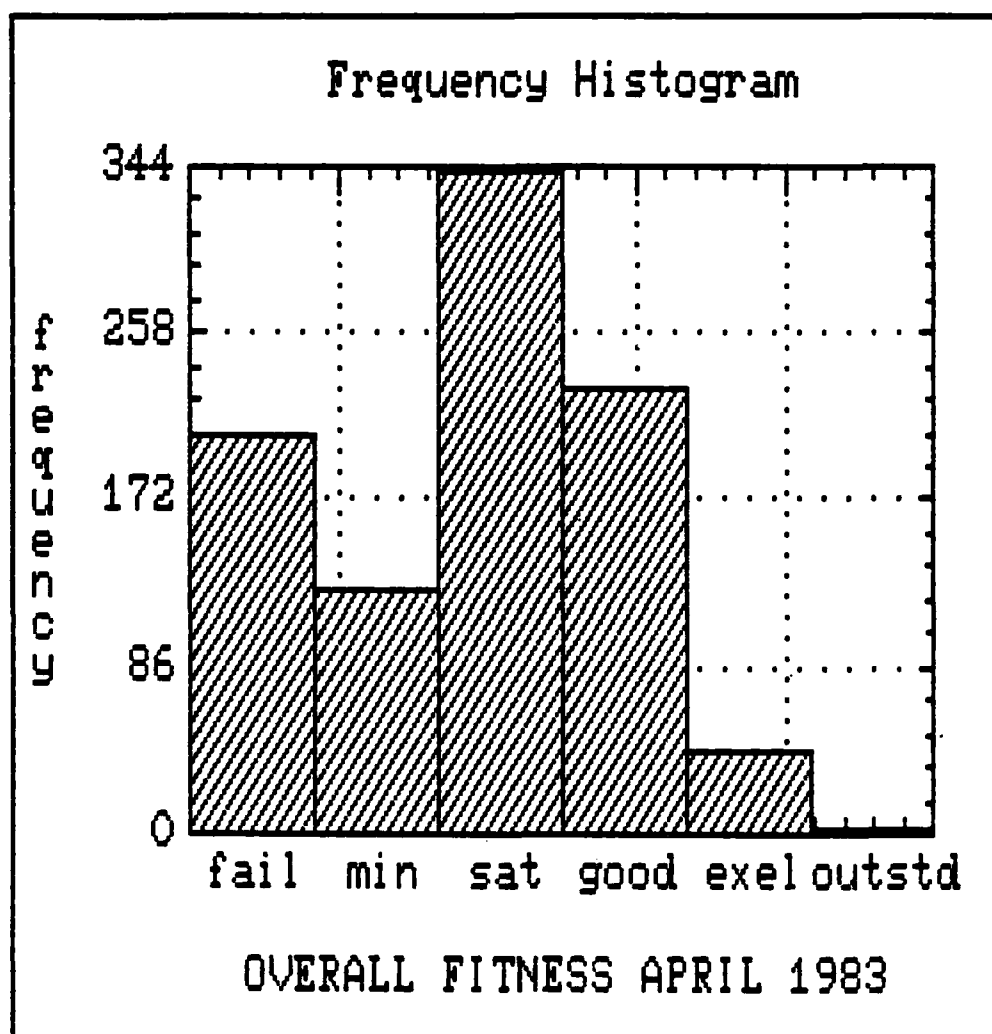


Figure 2 Overall Fitness April 1983  
Histogram

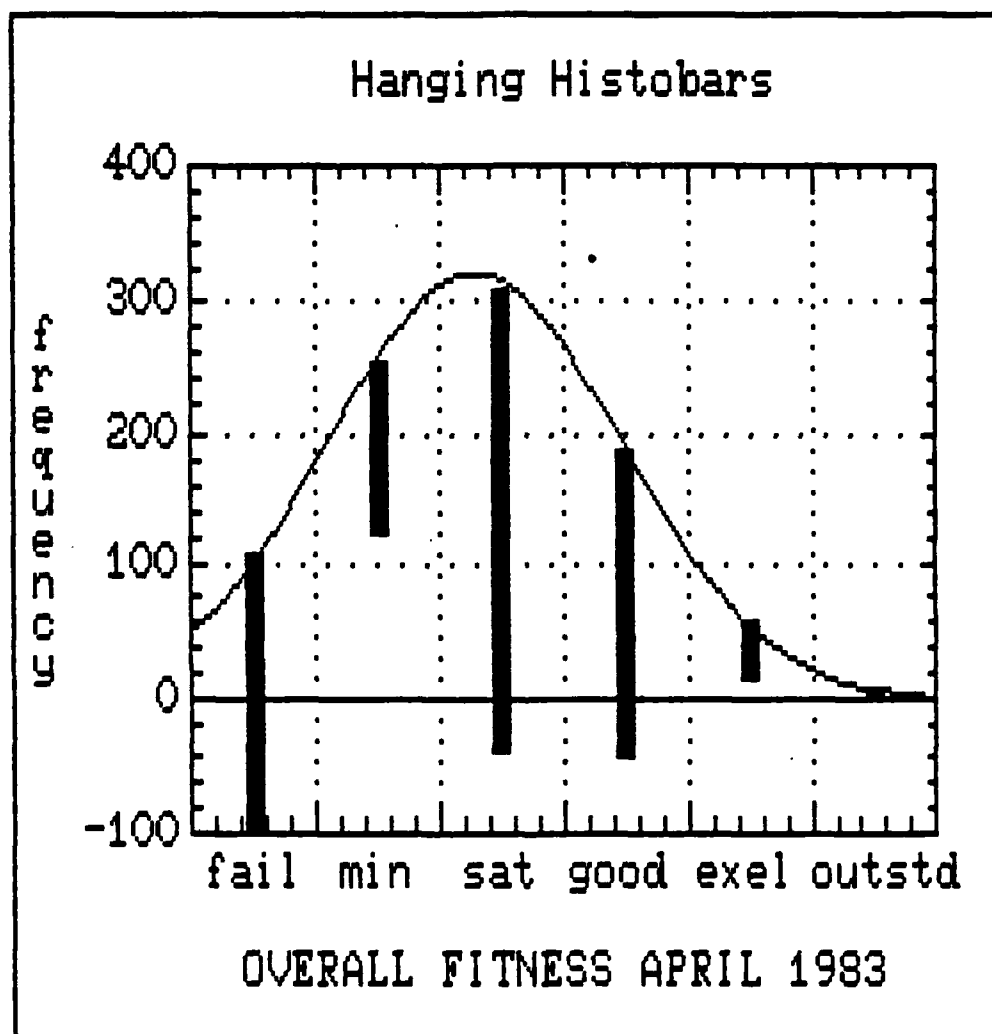


Figure 3 Overall Fitness April 1983  
Hanging Histobars

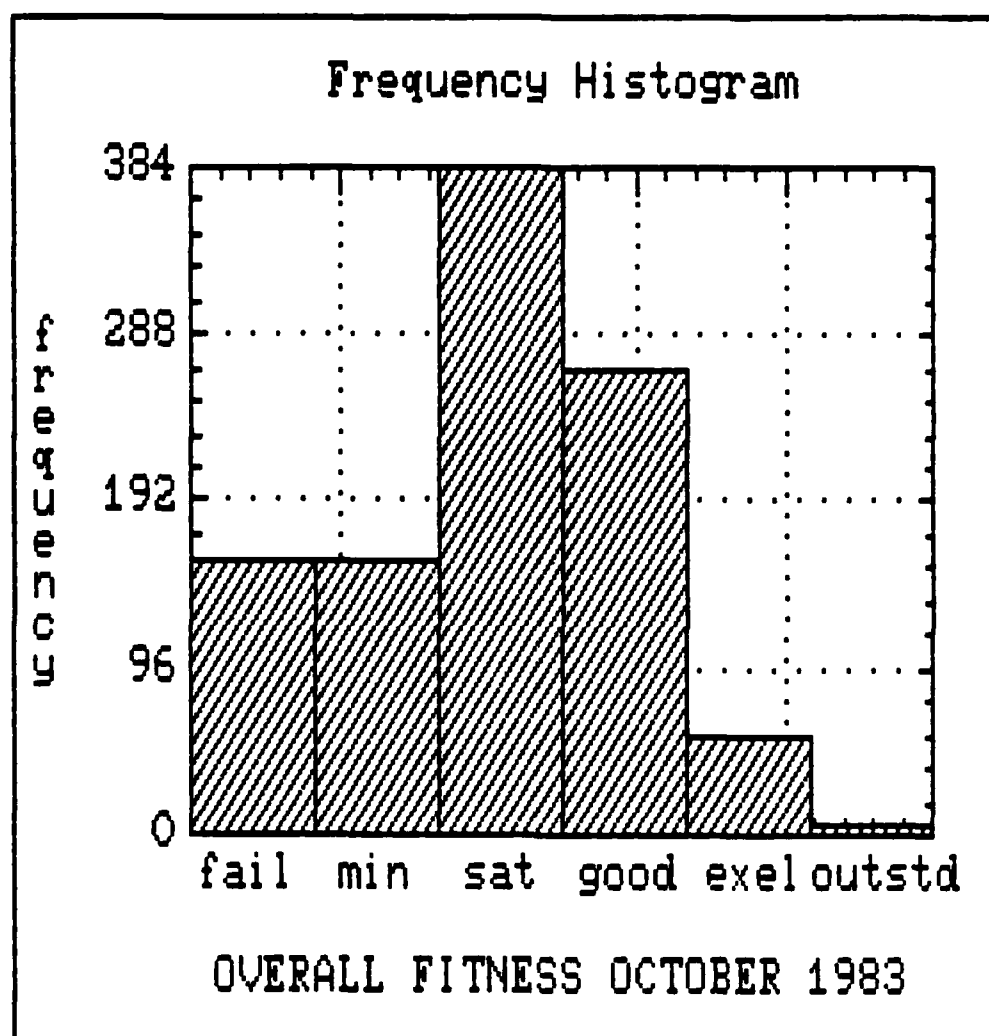


Figure 4 Overall Fitness October 1983 Histogram

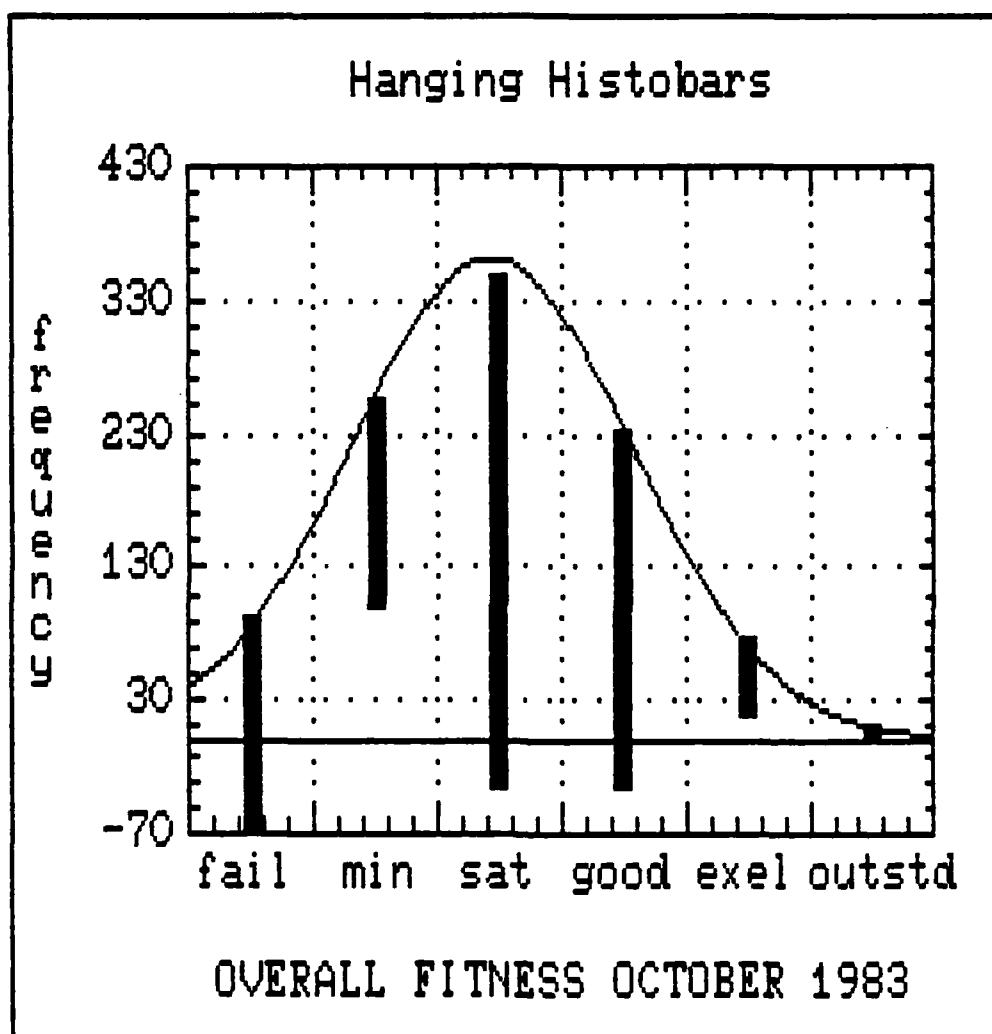


Figure 5 Overall Fitness October 1983  
Hanging Histobars

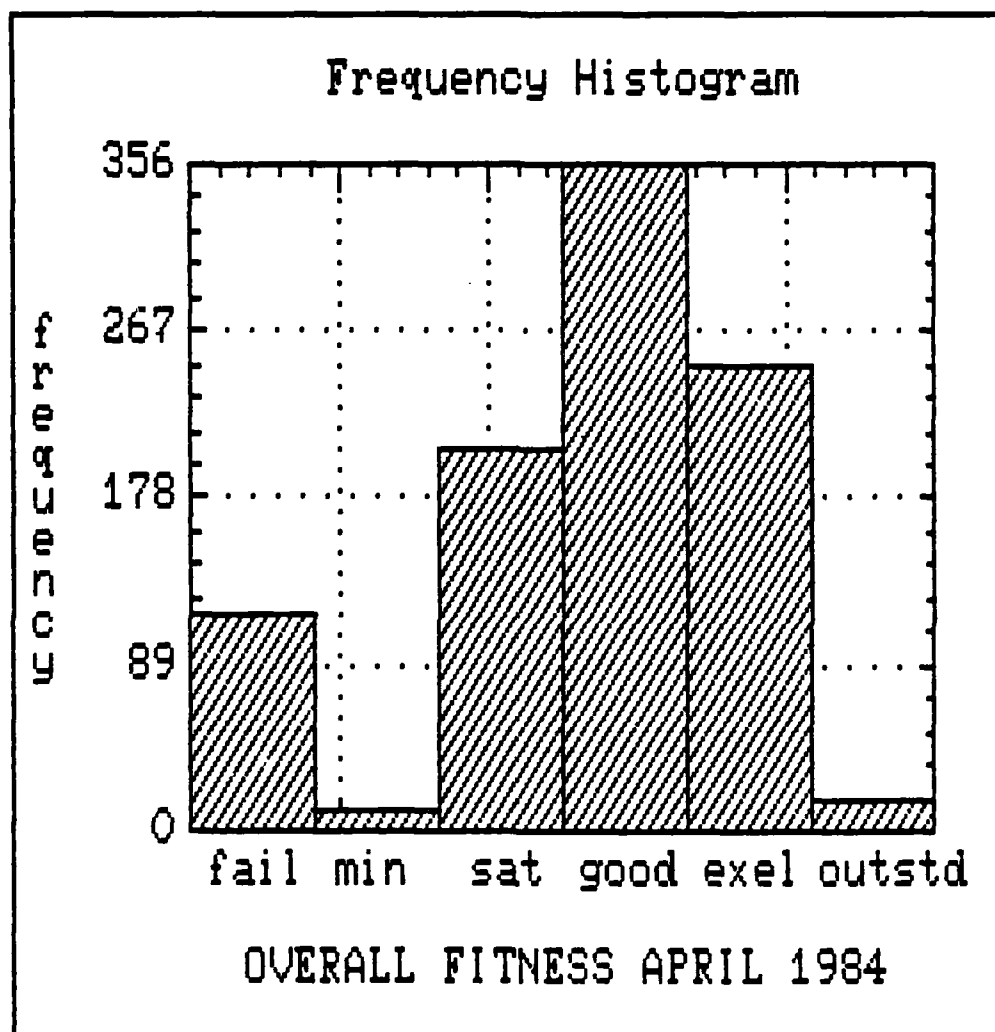


Figure 6 Overall Fitness April 1984 Histogram



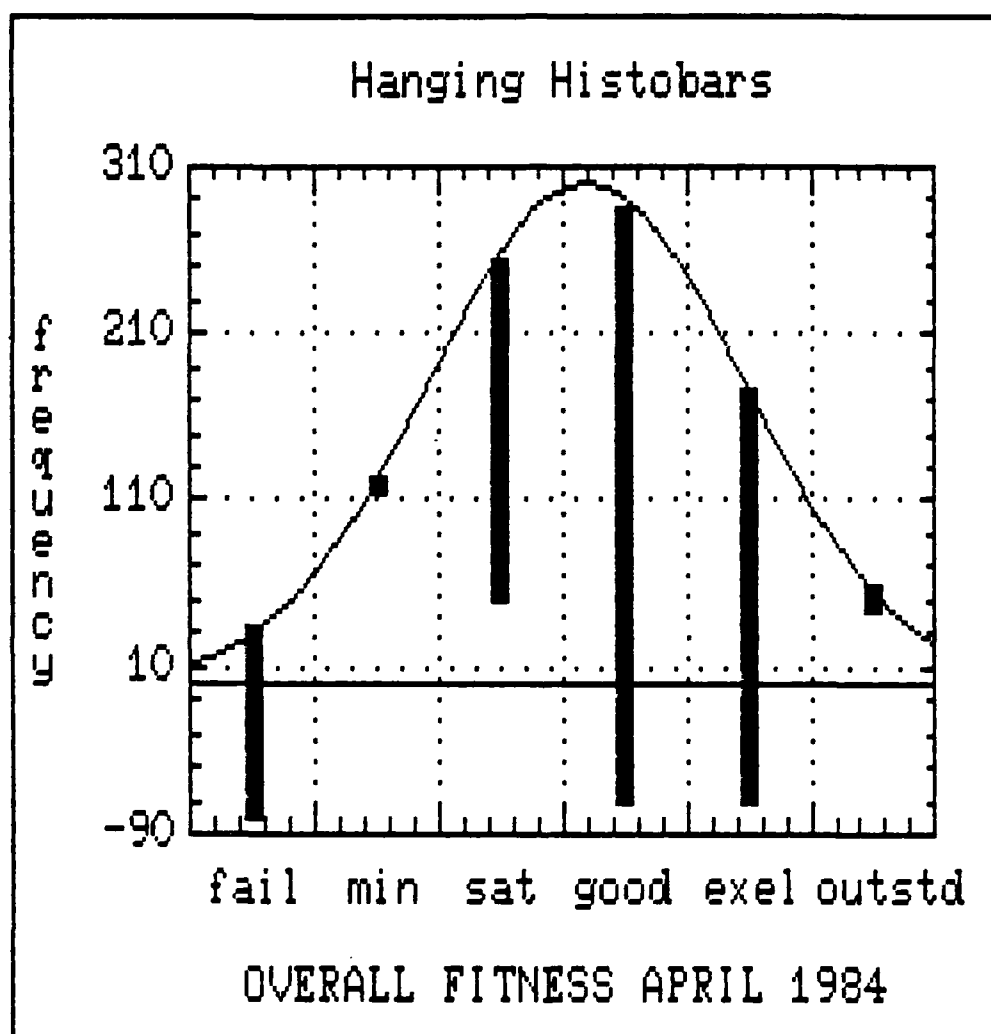


Figure 7 Overall Fitness April 1984  
Hanging Histobars

TABLE 2  
OVERALL FITNESS TEST COMPARISON  
TWO SAMPLE ANALYSIS

	Alpha	Conf Int	T Statistic	Sig	Conclude
APR 83 TO OCT 83	0.05	-.2552 -.0497	-2.91	.0037	Reject
OCT 83 TO APR 84	0.05	-.8650 -.6529	-14.04	.0000	Reject
APR 83 TO APR 84	0.05	-1.023 -.8010	-16.19	.0000	Reject

Note: The Null hypothesis states that there was no difference between the tests.  
The Alternate hypothesis states that there was a difference between the tests.

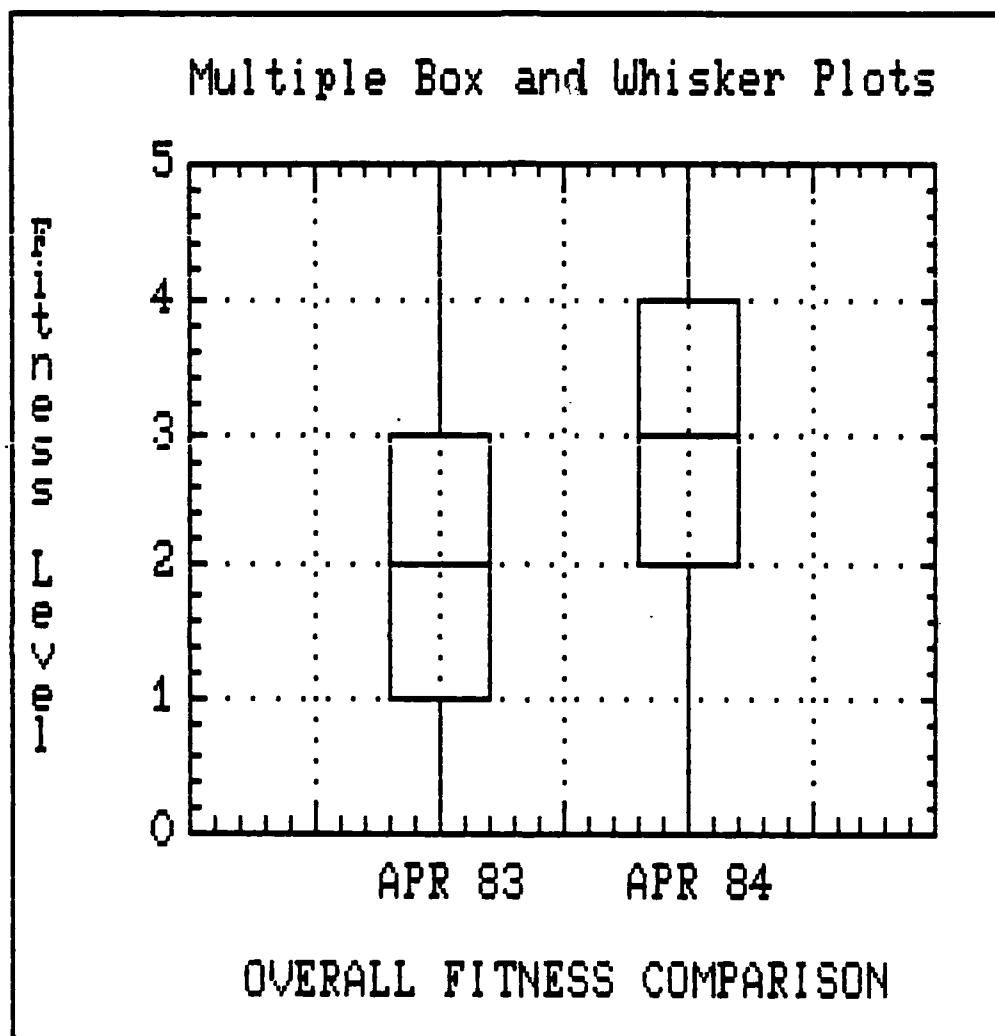


Figure 8 Overall Fitness Box and Whisker Plot

## B. MAINTENANCE DATA

Maintenance data was collected from the monthly maintenance summaries for the timeframe January 1983 to June 1984 on a monthly basis for items processed, repair turn around days, and maintenance hours worked. Table 3 provides the summary statistics for this data. The first line of each category indicates the values for the entire eighteen month period. The 83 line represents the data for the months January - June 1983, and the 84 line shows the results for the months January - June 1984. A comparison of mean and median values for each item between 83 and 84 reveals that the 84 values are lower. A two sample difference of means

TABLE 3

### MAINTENANCE SUMMARY STATISTICS

	Sample Size	Mean	Var	Std Dev	Median
Items					
Processed	18	2096.39	51844.4	227.70	2044.5
83	6	2110.33	81070.3	284.73	2040.0
84	6	2043.67	17923.5	133.88	2011.5
Repair Time	18	2.38	1.01	1.01	1.95
83	6	3.23	1.91	1.38	3.45
84	6	2.13	0.13	0.35	2.15
Maint. Hours	18	17466.4	8.04E6	2836.49	16957.2
83	6	19680.0	4.37E6	2090.17	19889.8
84	6	14973.0	310075	556.8	14909.4

comparison test was done to determine if these differences were significant. The results of this test are presented in Table 4. At the alpha = .05 level there is no significant difference between the two years in items processed. Repair

TABLE 4

MAINTENANCE COMPARISONS  
TWO SAMPLE ANALYSIS

JAN - JUN 1983 TO JAN - JUN 1984

	Alpha	Conf Int	T Statistic	Sig	Conclude
Items Processed	0.05	-219.6 352.9	.519	.615	No reject
Repair Time	0.10	.0605 2.173	1.92	.0843	Reject
Maint. Hours	0.05	2738.0 6674.3	5.329	.0003	Reject

Note: The Null hypothesis states that there was no difference between the time periods.

The Alternative hypothesis states that there was a difference between the time periods.

time differences are significant at the alpha = .10 level. The number of maintenance hours worked also showed a significant decrease at the alpha = .05 level. Figure 9 illustrates the fluctuations in items processed over the eighteen month period studied and Figure 10 reveals graphically that there was little change in the mean or median, although the distribution of the items processed was narrower in 84. Figure 11 depicts the dramatic reduction in repair turn around days over the period. The box and whisker plot in Figure 12 serves to further emphasize the significance of the reduction in repair turn around days. Not only does the mean decrease, but the spread of scores is drastically reduced. The time series plot for maintenance hours worked in

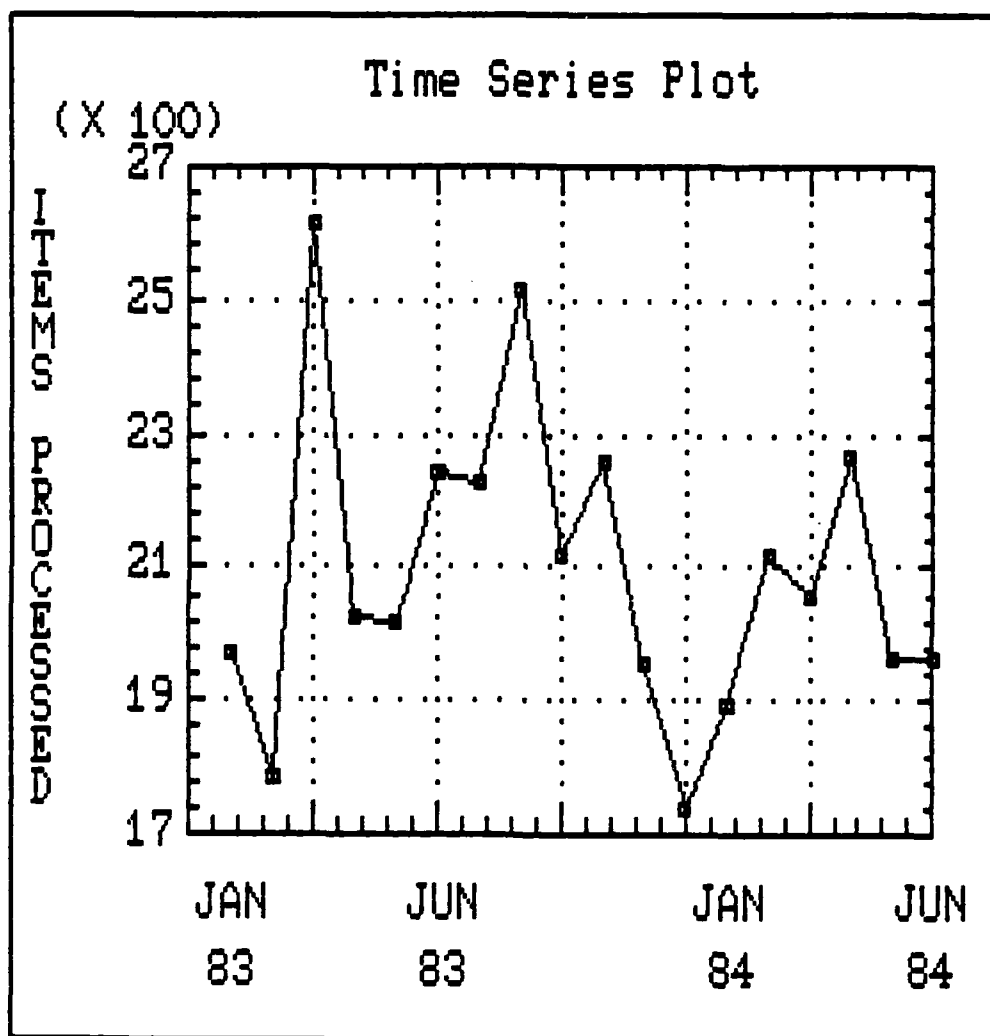


Figure 9 Items Processed Time Series Plot

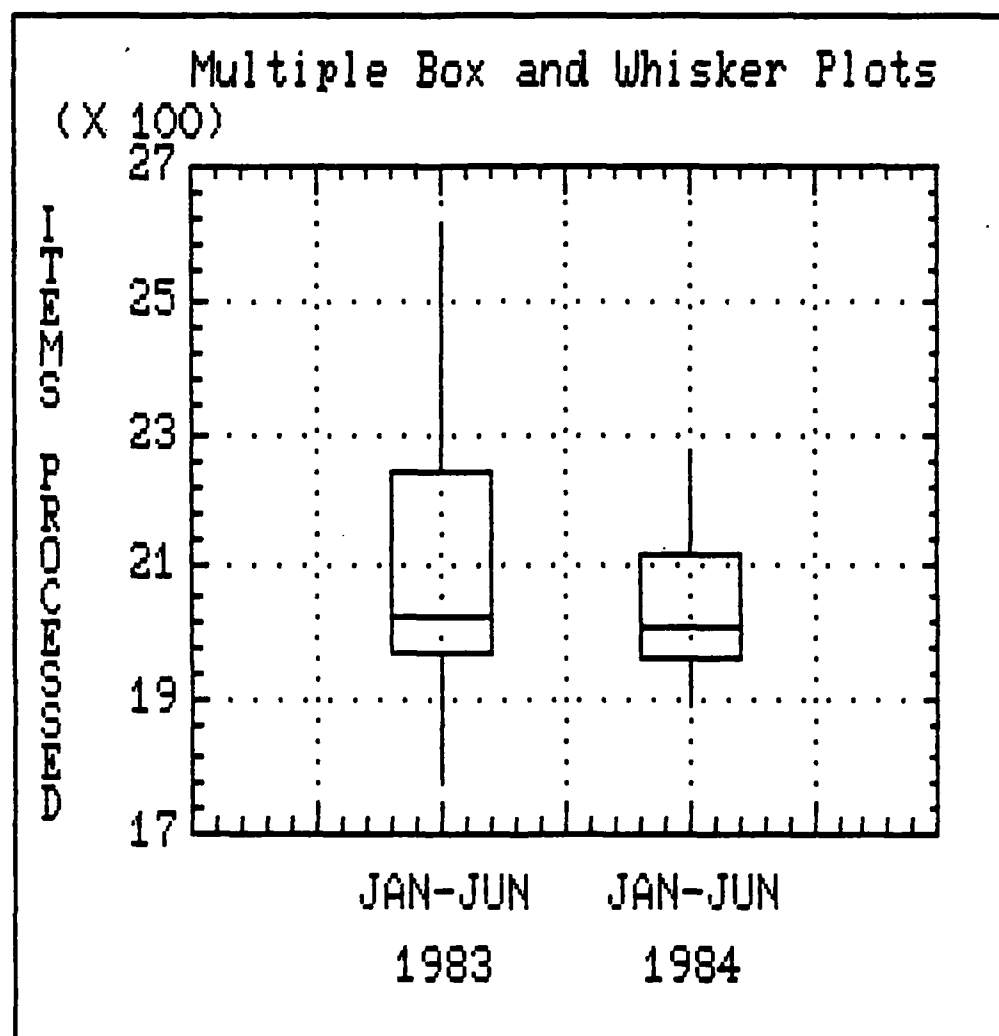


Figure 10 Items Processed Box  
and Whisker Plot

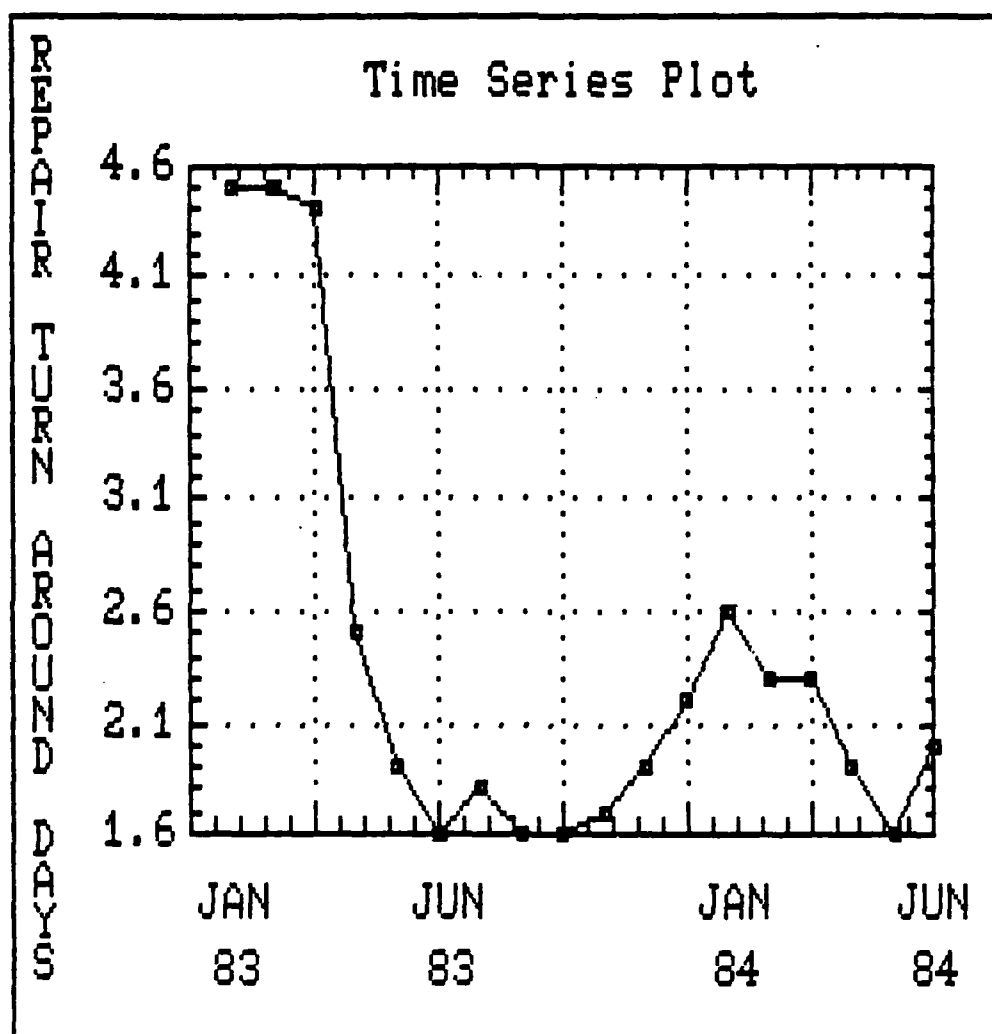


Figure 11 Repair Turnaround Days  
Time Series Plot



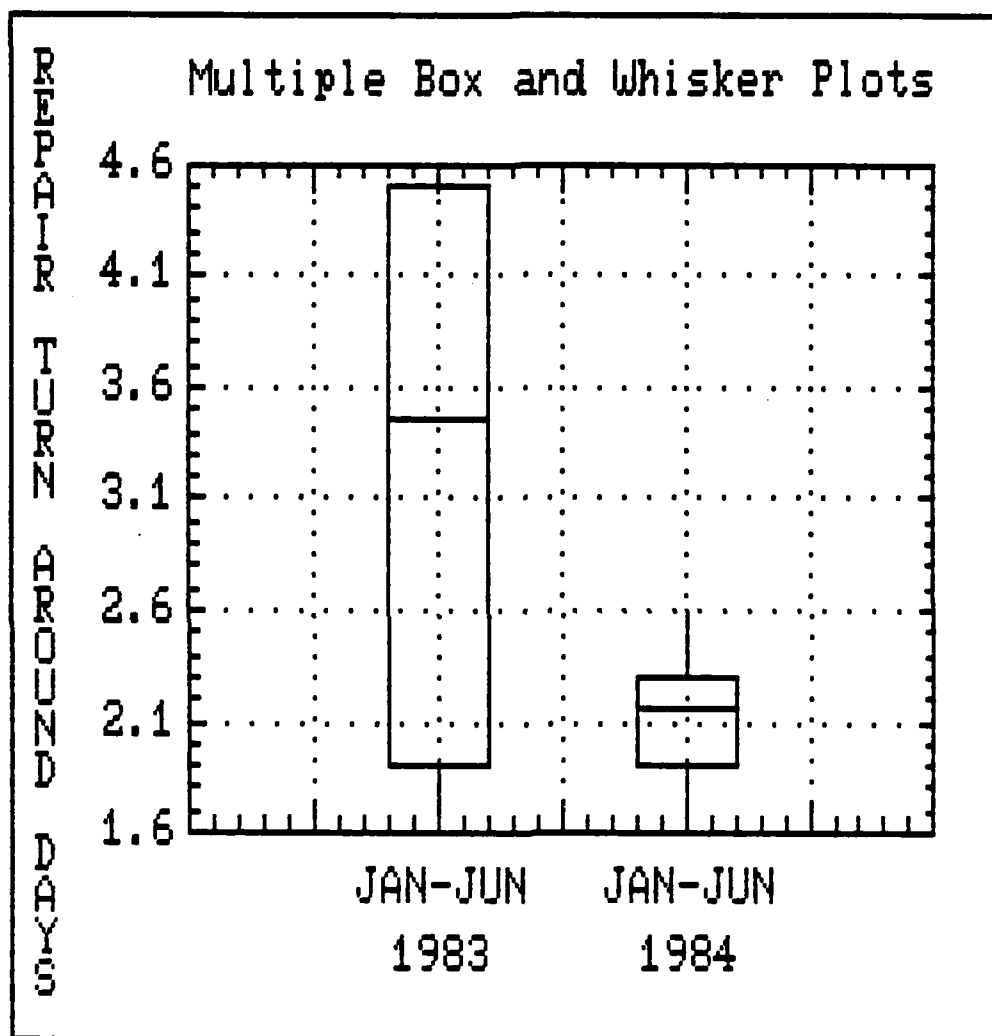


Figure 12 Repair Turnaround Days Box and Whisker Plot

Figure 13 shows the monthly fluctuations with the general trend toward a reduction in total hours for the 84 time period. The significance of the reduction in maintenance hours for the 84 period is demonstrated in Figure 14. The median of 19889.8 in 83 drops to 14909.4 in 84. The detached points from the box represent outlier values. The data indicate that the same workload was processed at a faster turn around rate with fewer maintenance hours expended when the first six months of 1983 are compared with the same time period in 1984.

#### C. MEDICAL DATA

Medical data was collected from the monthly morbidity reports for the Naval Air Station Pensacola Branch Clinic for the January 1983 to June 1984 timeframe. The following items were studied: outpatient visits, number of personnel assigned sick in quarters (SIQ), total days assigned SIQ, circulation diseases, motor vehicle accidents, alcoholic treatments, weight control cases, occupational injury and non occupational injury. Table 5 provides a summary of the statistics for these items. Note that the first line for each item has a sample size of 18, which represents the total timeframe of the study. The 83 and 84 lines, with sample sizes of 6 each, represent the first six months of each year respectively. Excluding the outpatient visits category, all items show a reduction in means from 83 to 84. The outpatient visits category shows a slight increase in the mean

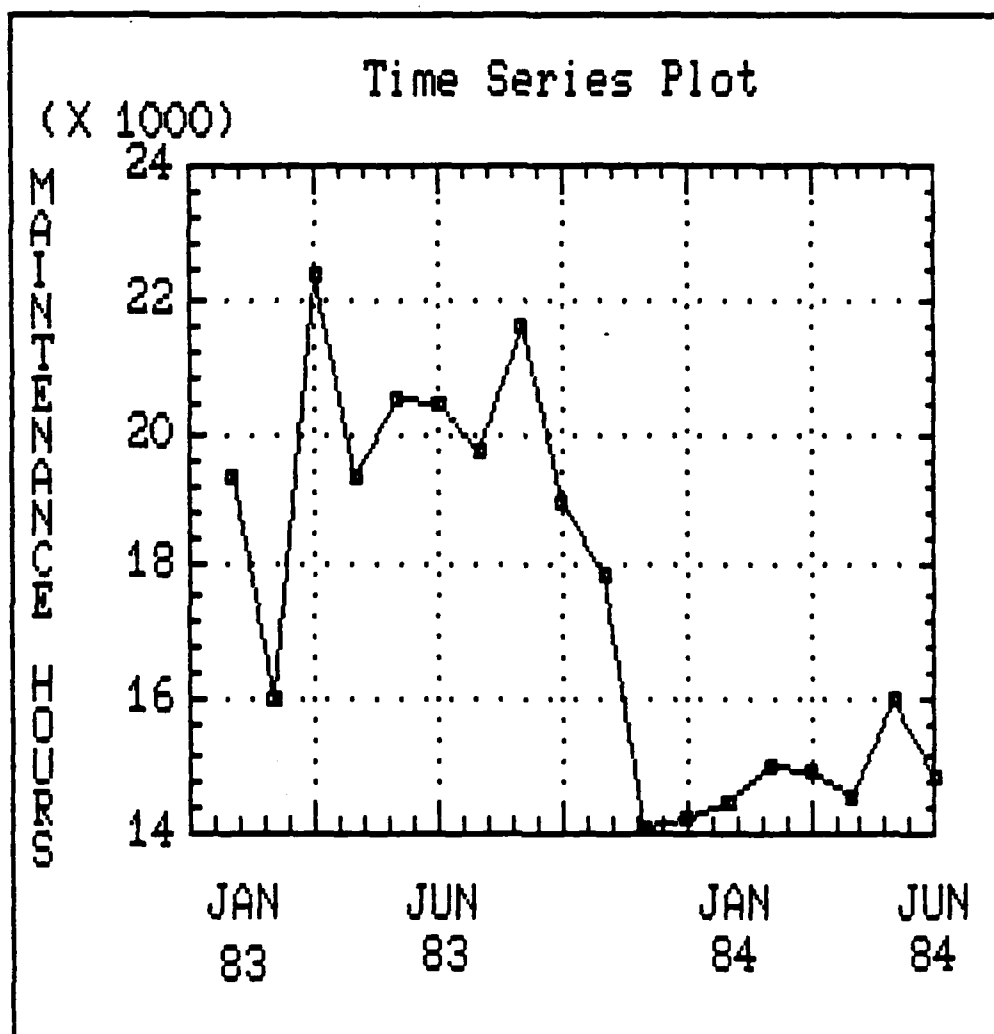


Figure 13 Maintenance Hours Time Series Plot

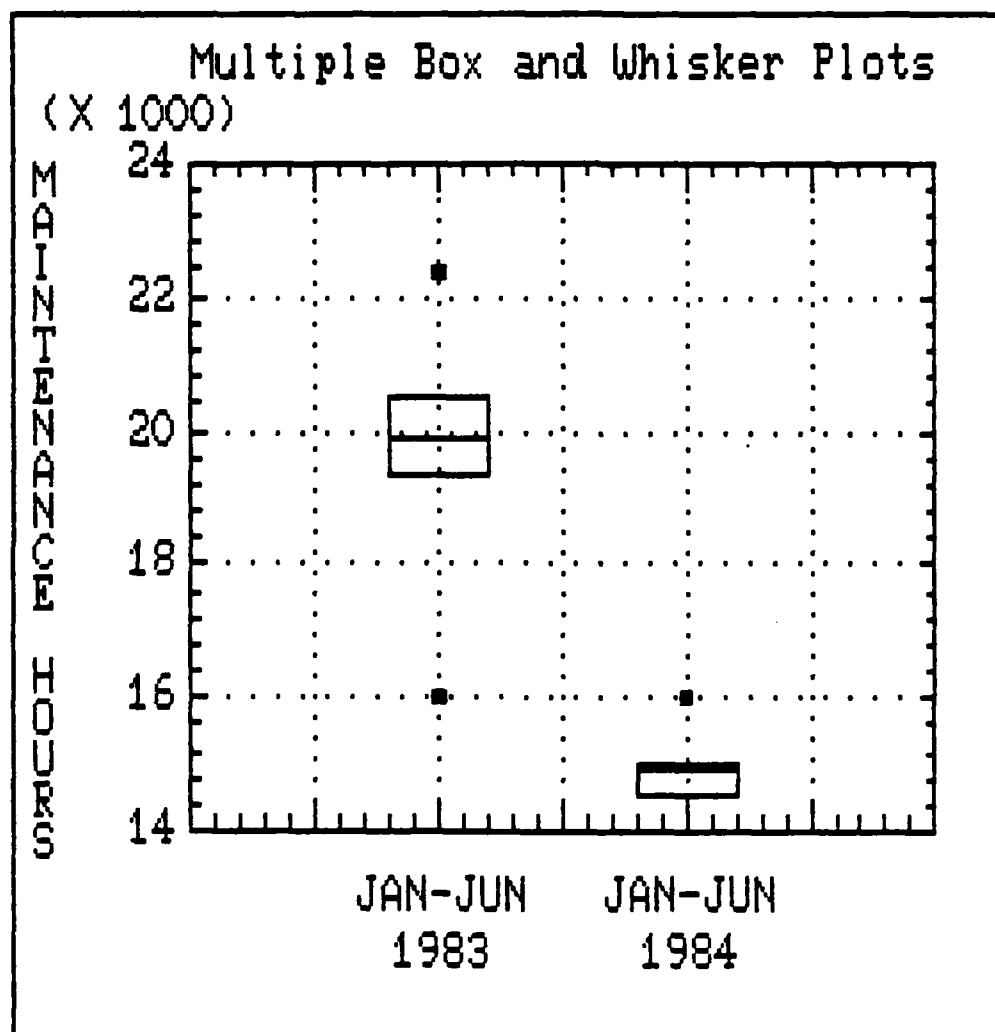


Figure 14 Maintenance Hours Box and Whisker Plot

TABLE 5

## MEDICAL SUMMARY STATISTICS

	Sample Size	Mean	Var	Std Dev.	Median
Outpatient Visits	18	3459.89	94348.6	307.16	3496.5
83	6	3462.33	86064.3	293.37	3501.5
84	6	3575.33	12078.1	109.94	3549.0
Assigned SIQ	18	88.39	1713.8	41.40	100.5
83	6	104.83	2957.4	54.38	119.5
84	6	91.17	612.6	24.75	94.5
Days SIQ	18	129.67	2135.5	46.21	142.5
83	6	137.17	5281.8	72.58	147.0
84	6	119.5	953.9	30.89	120.0
Circulation Diseases	18	37.06	316.29	17.78	39.5
83	6	42.83	96.17	9.81	41.5
84	6	22.83	498.97	22.34	16.5
MV Accidents	18	3.17	13.56	3.68	2.0
83	6	5.17	13.37	3.66	4.0
84	6	1.17	3.77	1.94	0.5
Alcoholic Treatments	18	3.61	12.13	3.48	3.0
83	6	6.33	21.06	4.59	5.5
84	6	1.83	2.97	1.72	1.5
Wt. Control	18	47.28	858.21	29.30	39.5
83	6	67.83	1619.77	40.25	82.0
84	6	36.83	180.17	13.42	39.5
Occ. Injury	18	68.61	964.13	31.05	64.0
83	6	103.33	121.87	11.04	103.5
84	6	45.83	400.17	20.00	40.0
Non Occ. Injury	18	56.67	557.88	23.62	51.5
83	6	76.0	274.0	16.56	74.0
84	6	38.0	182.8	13.52	37.0

value. In order to test for the significance of these differences a two sample difference of means analysis was done for each item. Table 6 provides the results of this test. At the alpha = .05 level, there was no significant difference between 83 and 84 for outpatient visits, # assigned SIQ, and total days SIQ. The remaining items showed a significant decrease from 83 to 84. Most notable was the reduction in occupational injury reported at the .0001 significance level with a mean change from 103.33 in 83 to a mean of 45.83 in 84. Figures 15 - 32 provide a time series and box and whisker plot for each item to illustrate the fluctuations over time and the comparisons of 83 to 84.

#### D. INTERVIEW DATA

Interviews were conducted with the Commanding Officer and Executive Officer who were in command during the time of this study. Interviews were conducted in Pensacola, Florida by the researcher in October 1985. The interviews were taperecorded. Below is a transcript, in paraphrased form, of the results of these interviews. The QUESTIONS will be noted in all capital letters, while the response will be in upper and lower case letters.

COMMANDING OFFICER: CAPTAIN J. B. MCKAMEY, USN

Captain McKamey was the Naval Air Station Pensacola Commanding Officer from SEP 82 to AUG 84.

1. WHY DID YOU SUPPORT THE HEALTH AND PHYSICAL READINESS PROGRAM? WHAT WAS YOUR VALUE AND WHAT DID YOU HOPE TO GAIN FROM IT?

TABLE 6

MEDICAL COMPARISONS  
TWO SAMPLE ANALYSIS

JAN - JUN 1983 TO JAN - JUN 1984					
	Alpha	Conf Int.	T Statistic	Sig	Conclude
Outpatient Visits	0.05	-398.1 172.1	-.883	.3977	No reject
# Assigned SIQ	0.05	-40.70 68.03	.560	.5603	No reject
Days SIQ	0.05	-54.18 89.52	.548	.5957	No reject
Circulation Diseases	0.10	1.945 38.06	2.01	.0724	Reject
MV Accidents	0.05	.2338 7.766	2.38	.0395	Reject
Alcoholic Treatments	0.05	.0394 8.961	2.25	.0483	Reject
Weight Control Cases	0.11	.6162	1.79	.1038	Reject
Occ Injury	0.05	36.71 78.29	6.16	.0001	Reject
Non Occ Injury	0.05	18.55 57.45	4.36	.0014	Reject

Note: The Null hypothesis stated that there was zero difference between the time periods.

The Alternate hypothesis stated that there was a difference between the time periods.

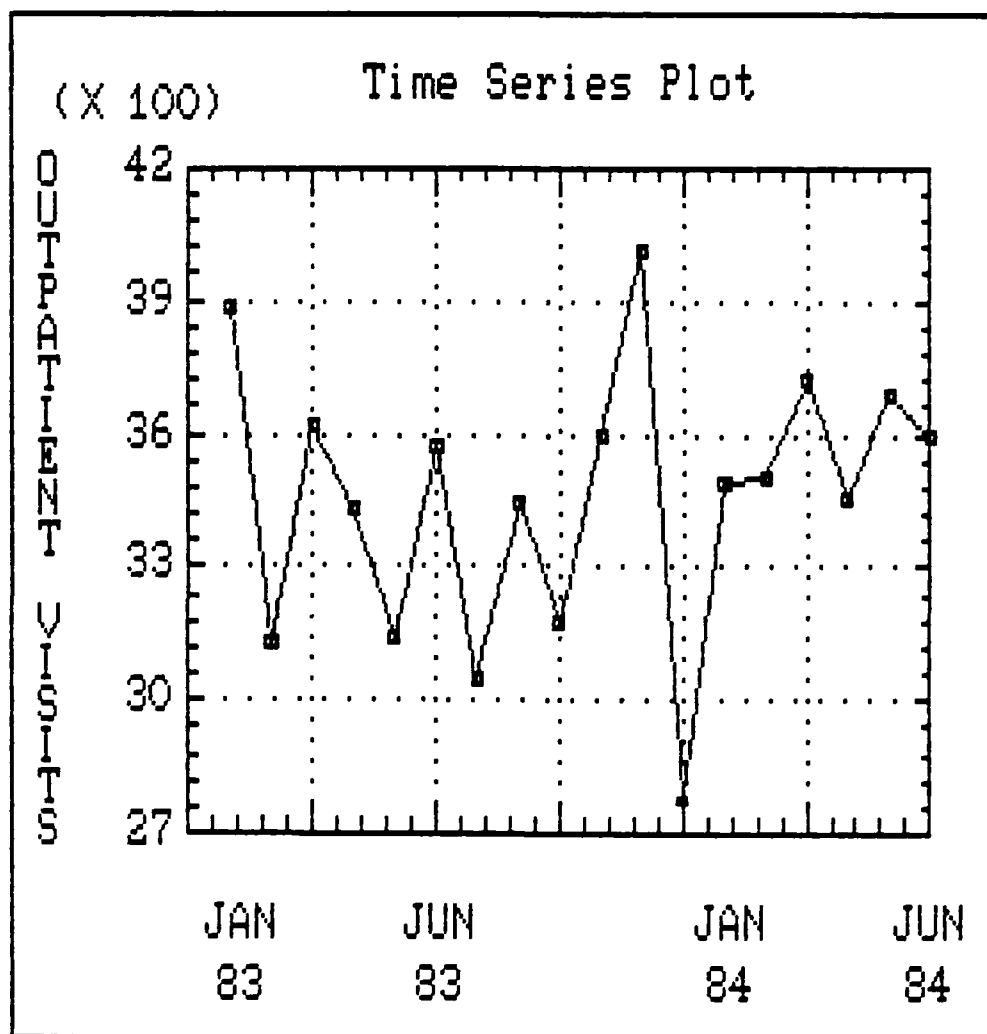


Figure 15 Outpatient Visits Time Series Plot



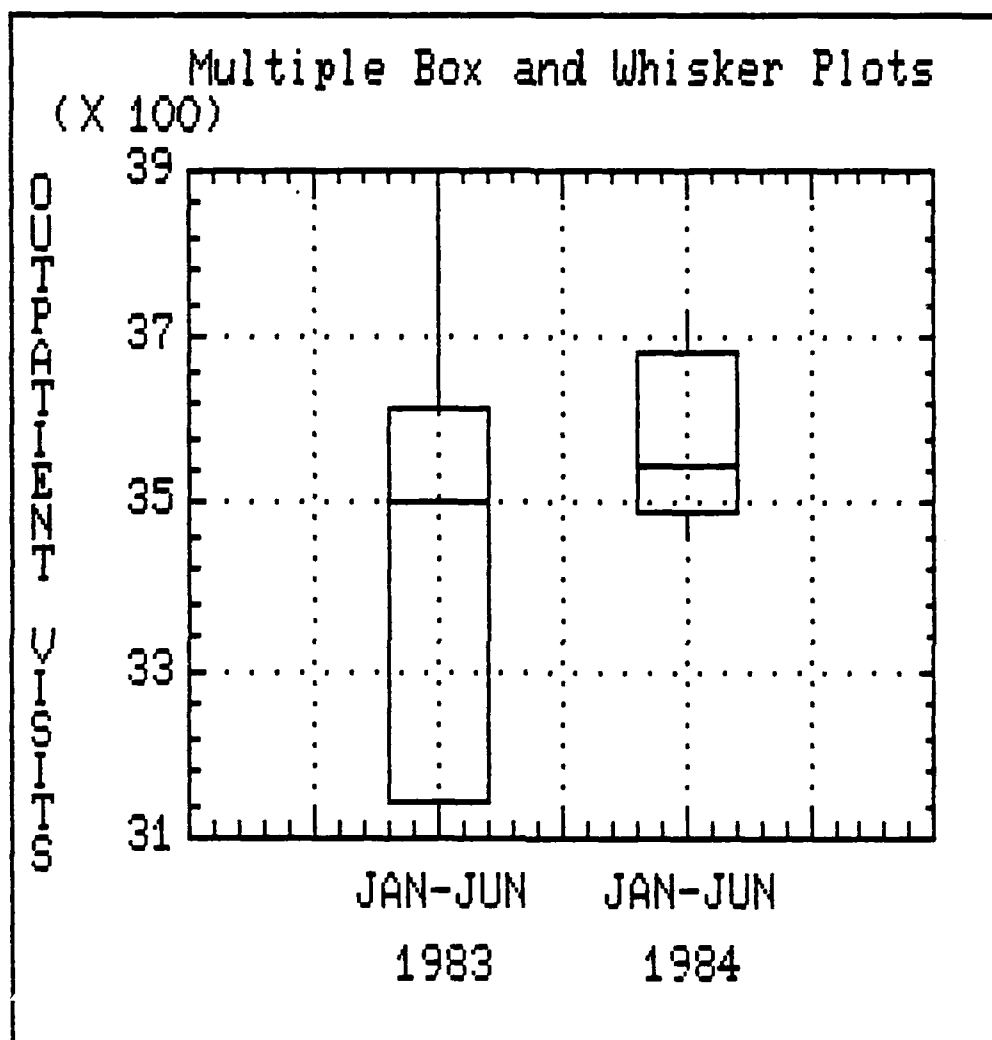


Figure 16 Outpatient Visits Box and Whisker Plot

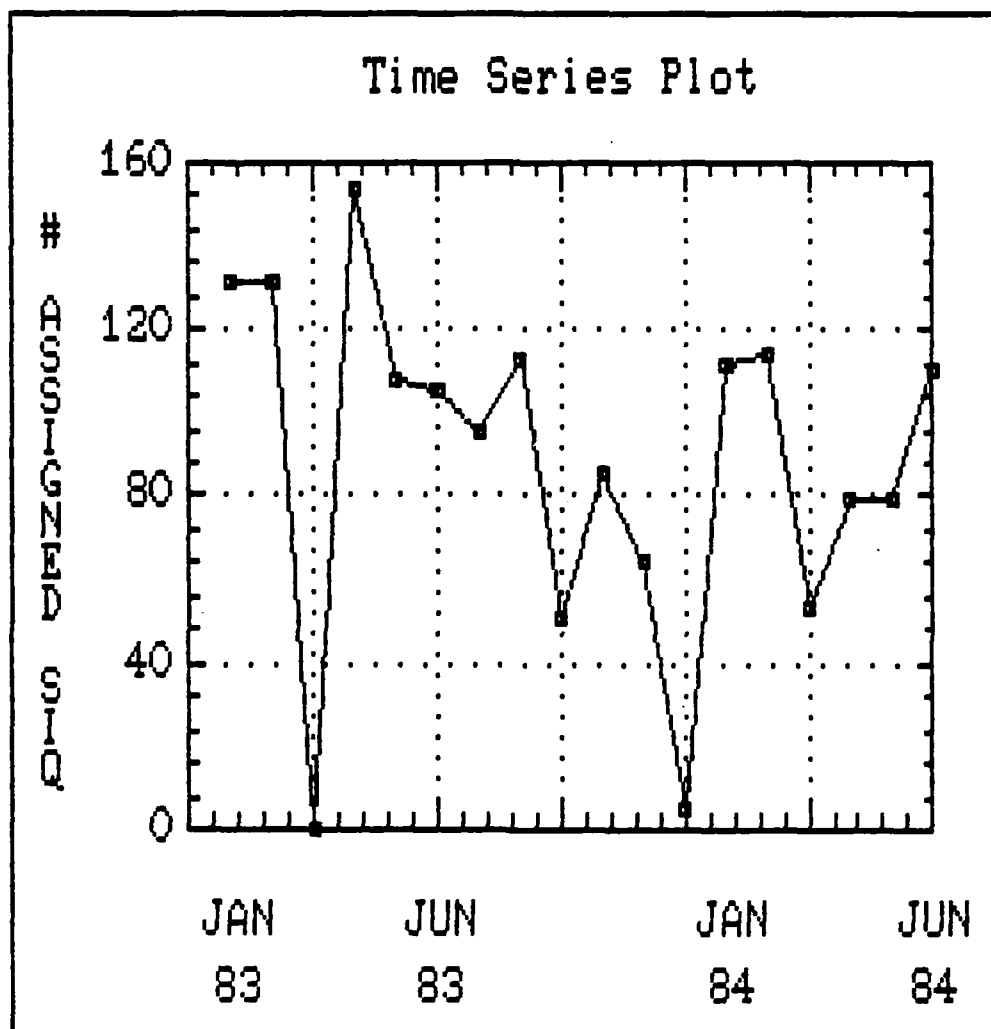


Figure 17 # Assigned SIQ Time Series Plot

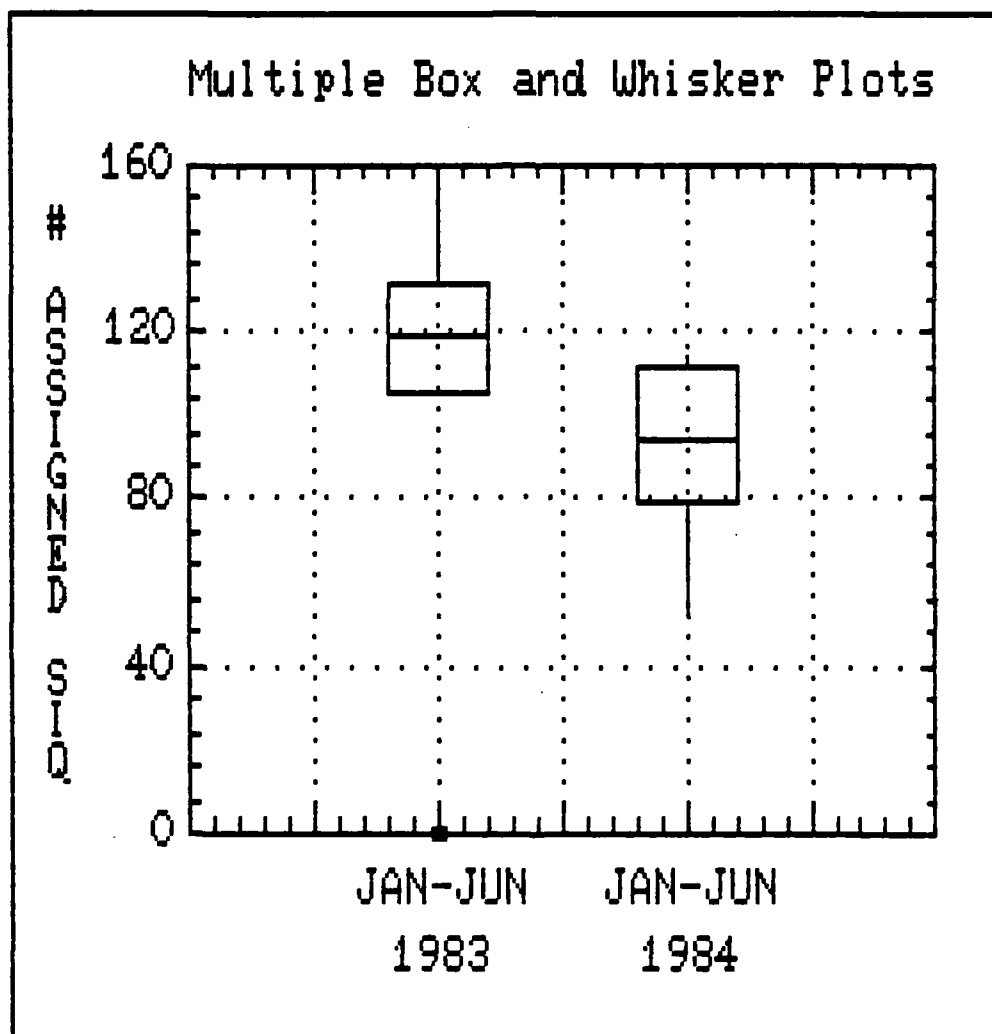


Figure 18 # Assigned SIQ Box and Whisker Plot

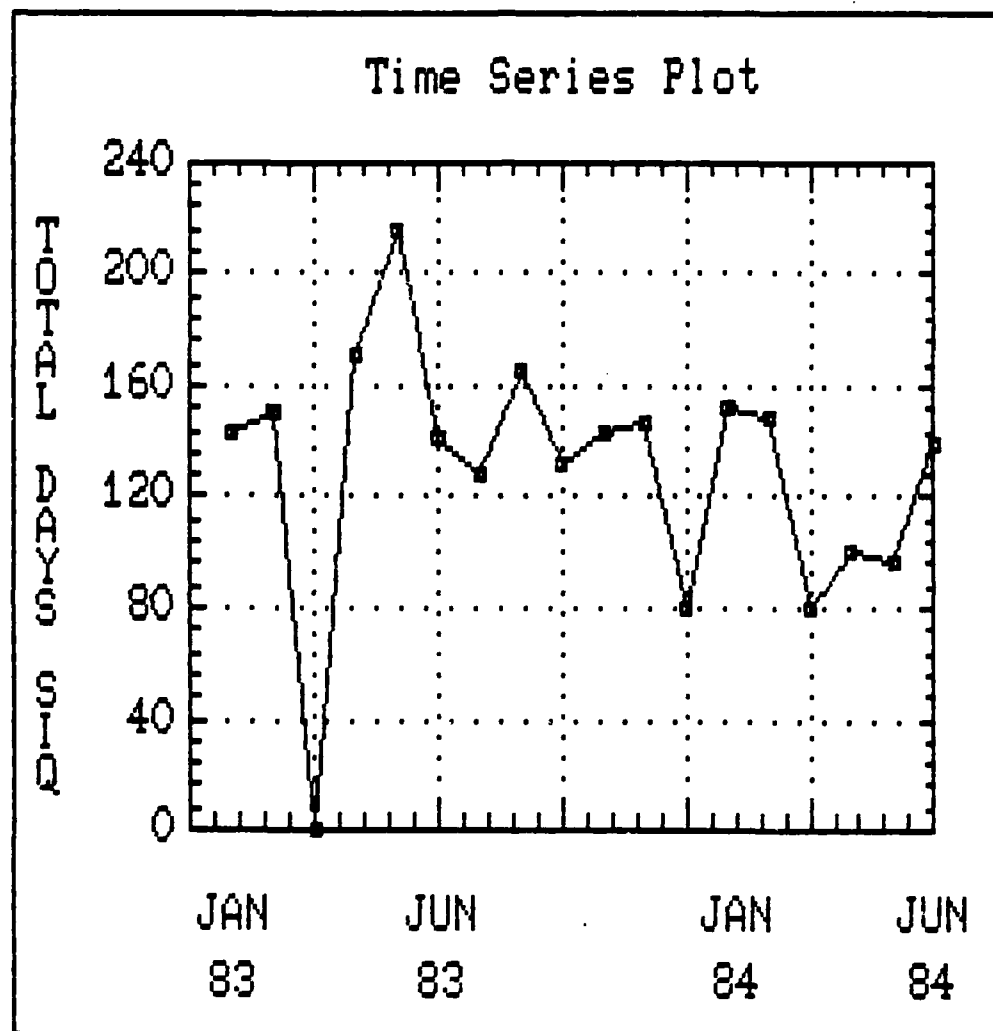


Figure 19 Total Days SIQ Time Series Plot

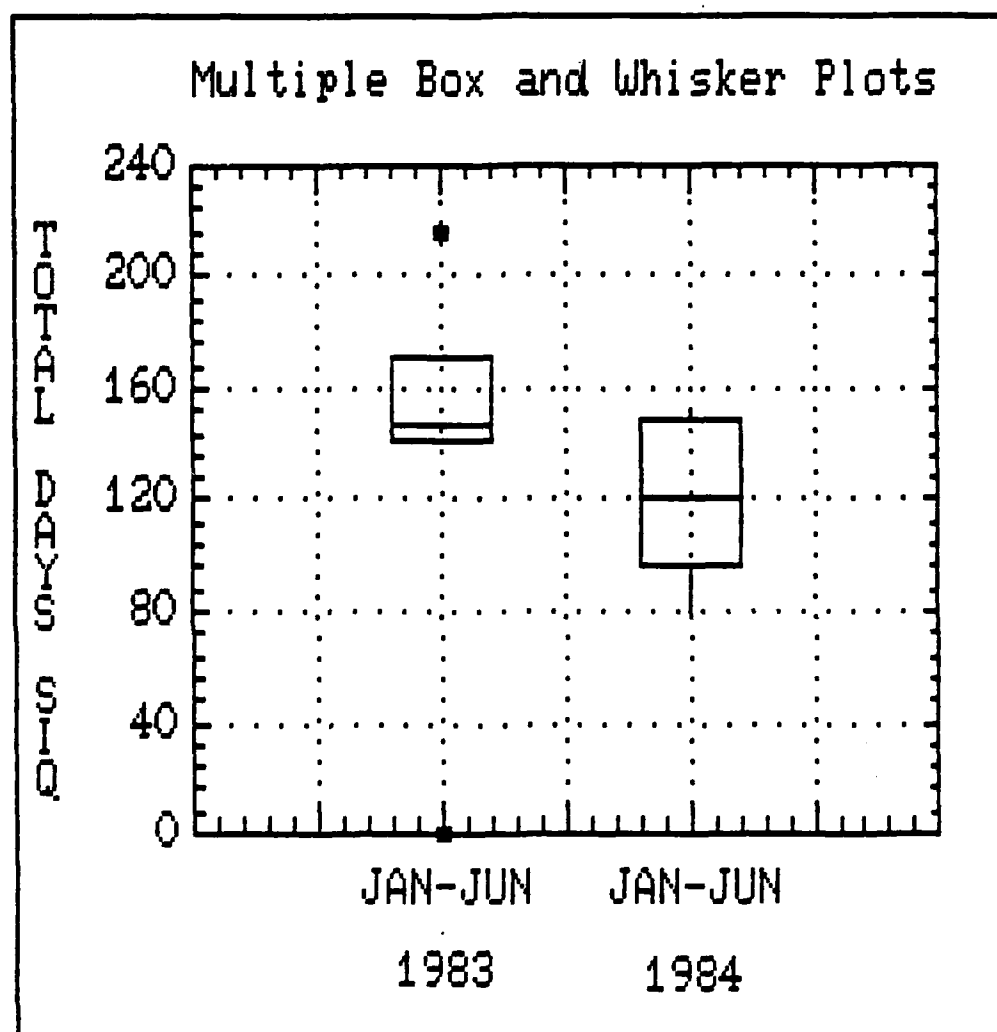


Figure 20 Total Days SIQ Box and Whisker Plot

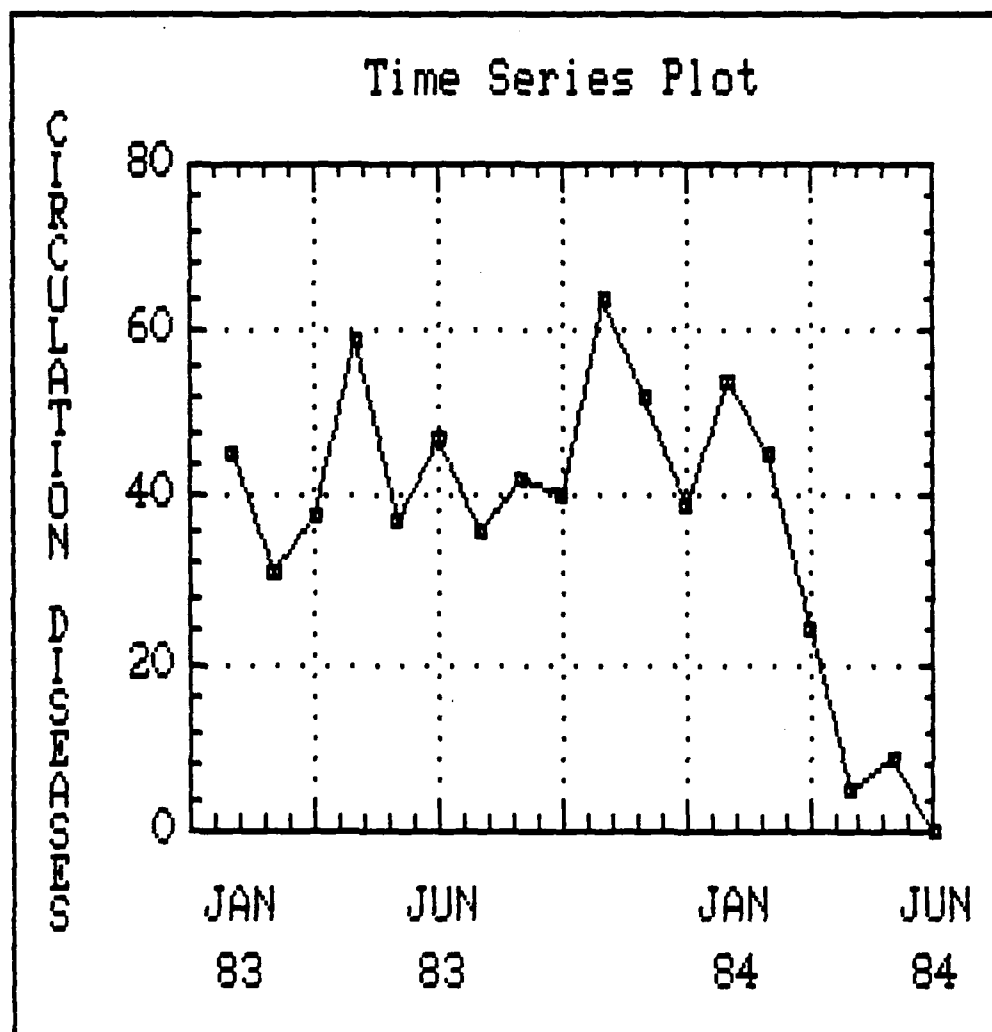


Figure 21 Circulation Diseases Time Series Plot

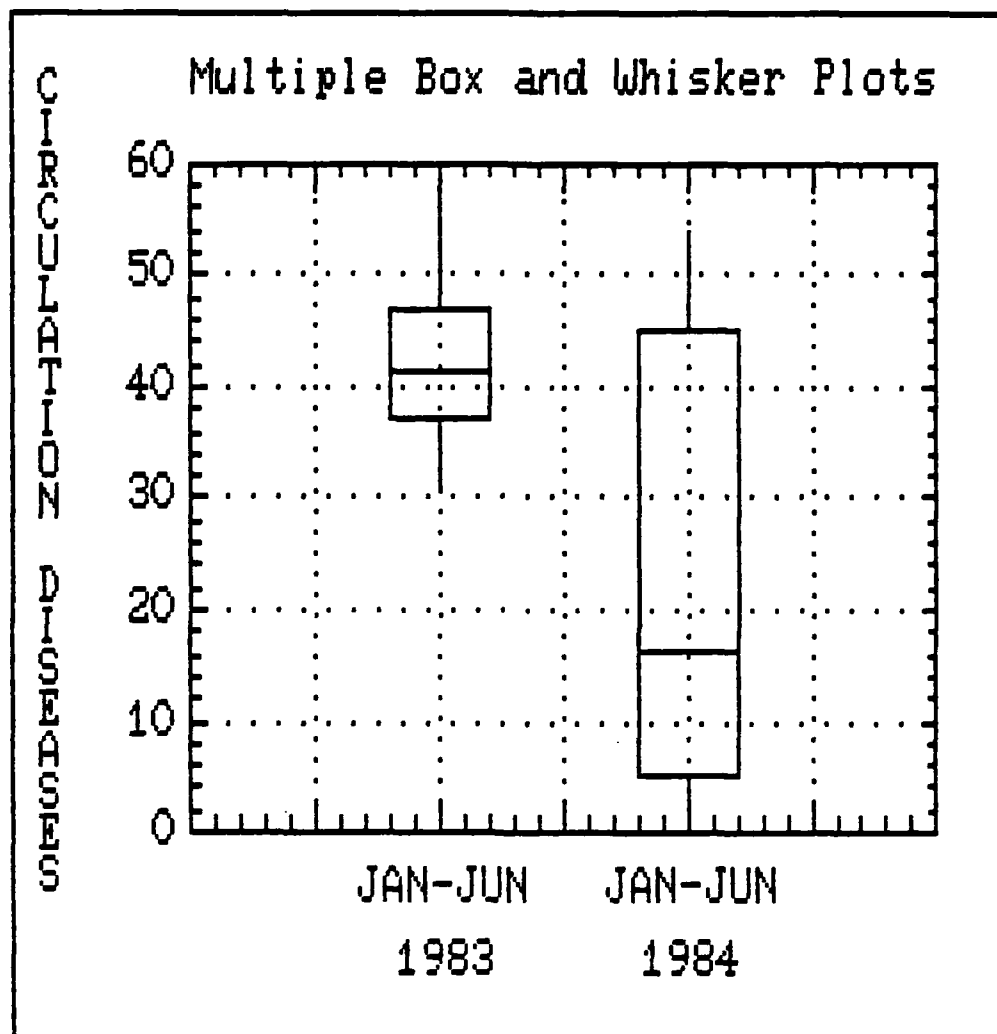


Figure 22 Circulation Diseases Box and Whisker Plot

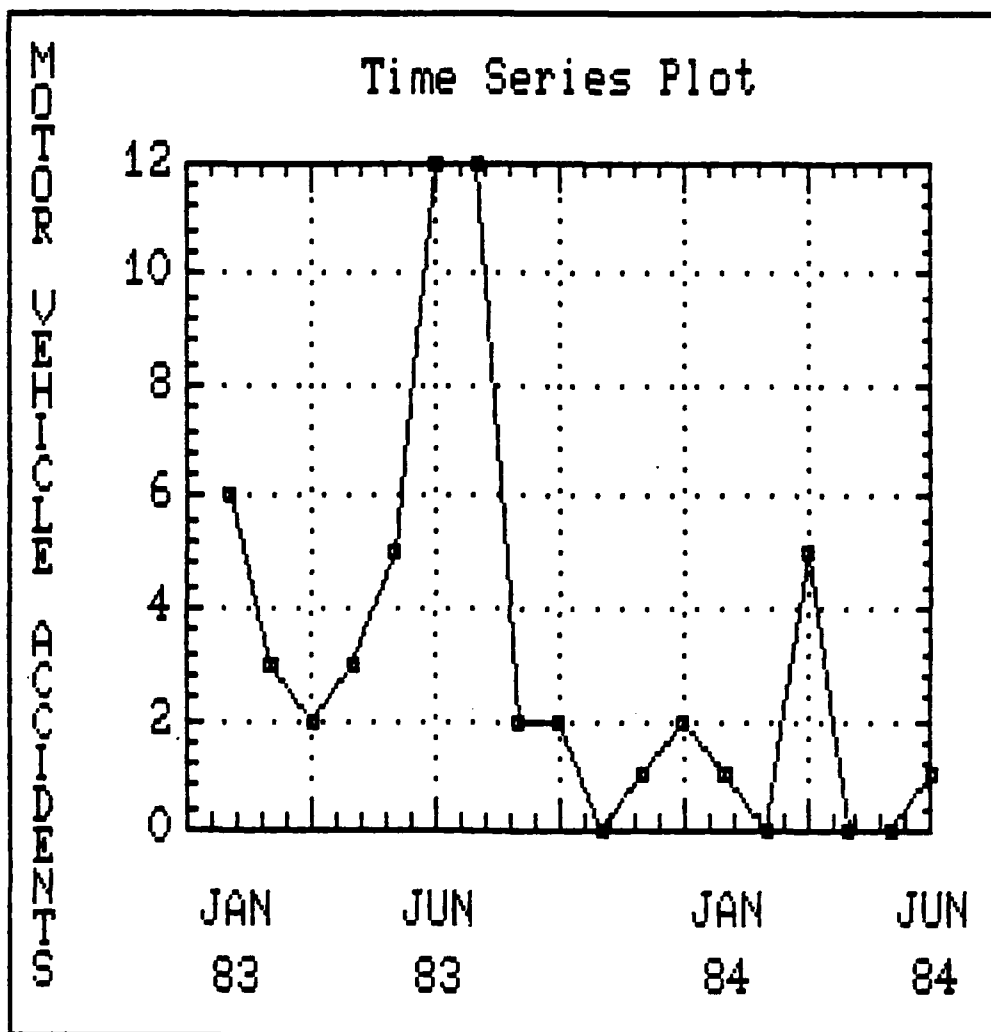


Figure 23 Motor Vehicle Accidents Time Series Plot



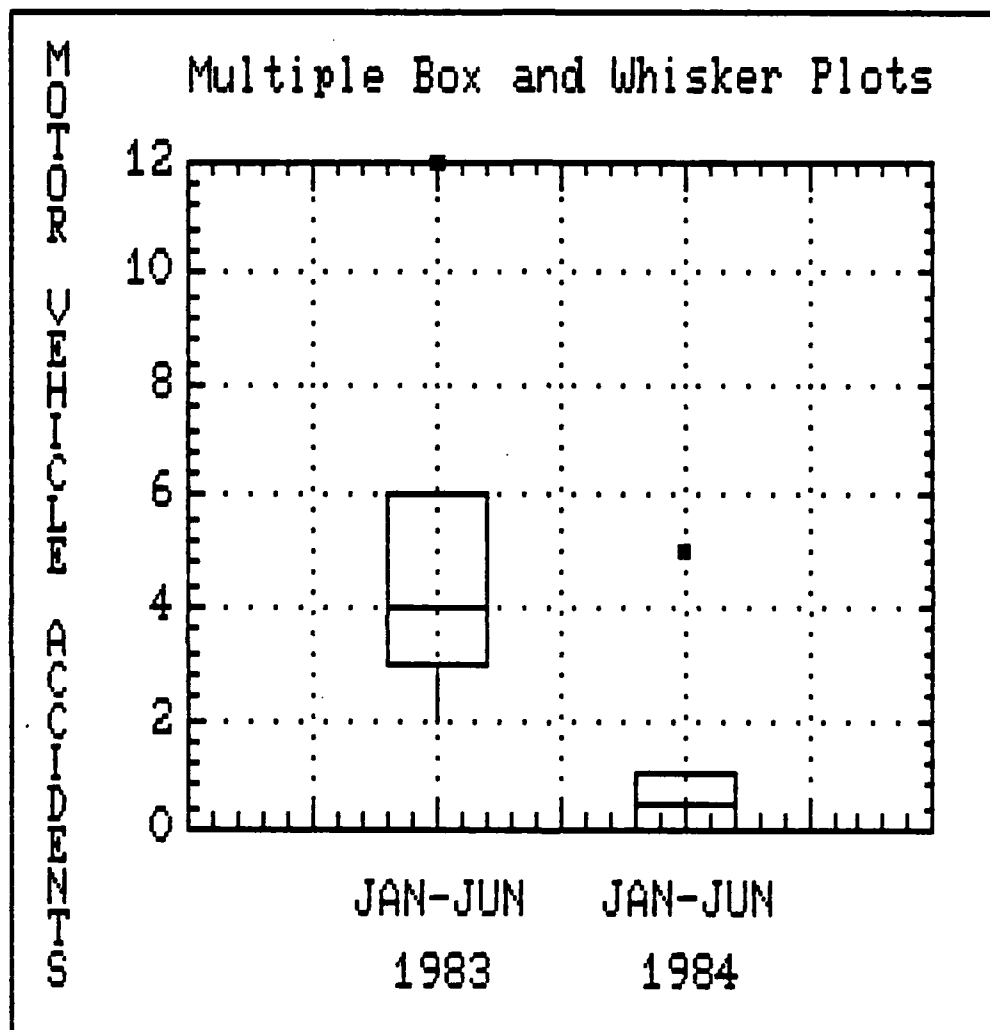


Figure 24 Motor Vehicle Accidents Box and Whisker Plot

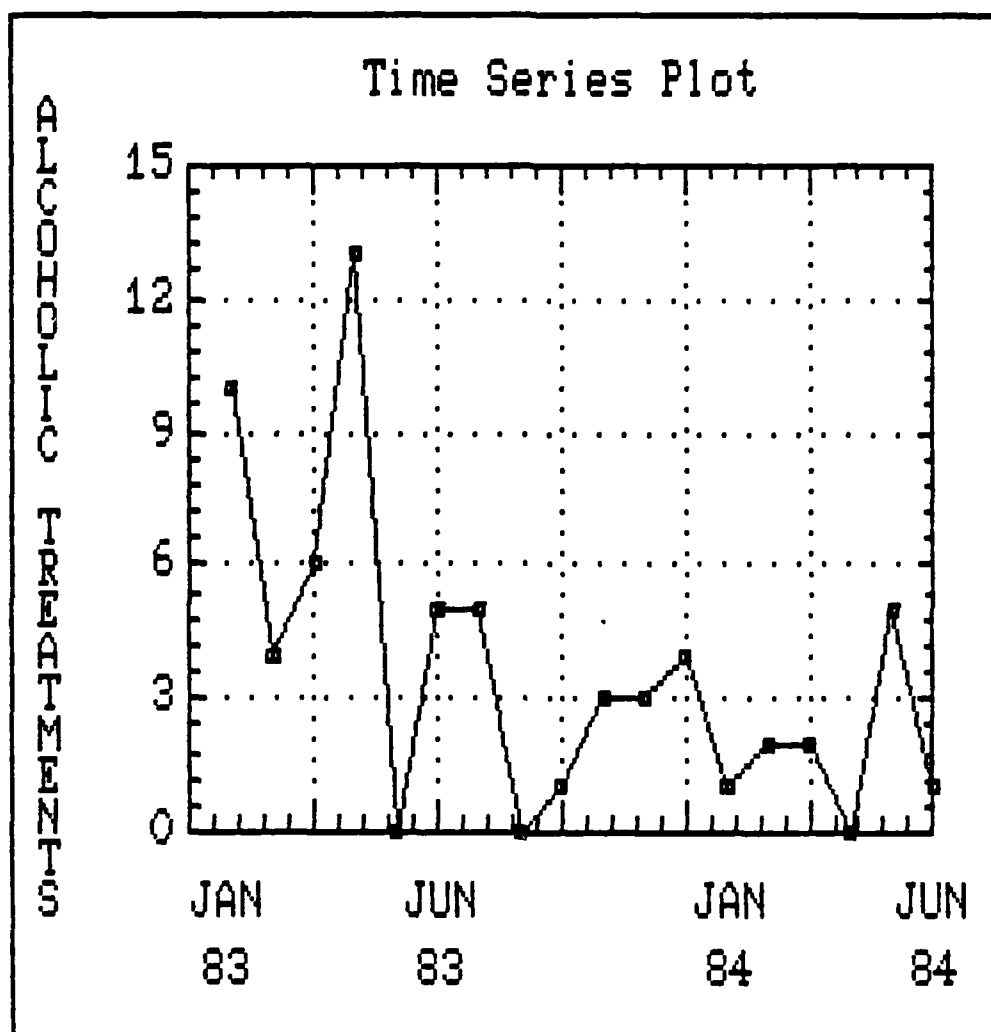


Figure 25 Alcoholic Treatments Time Series Plot

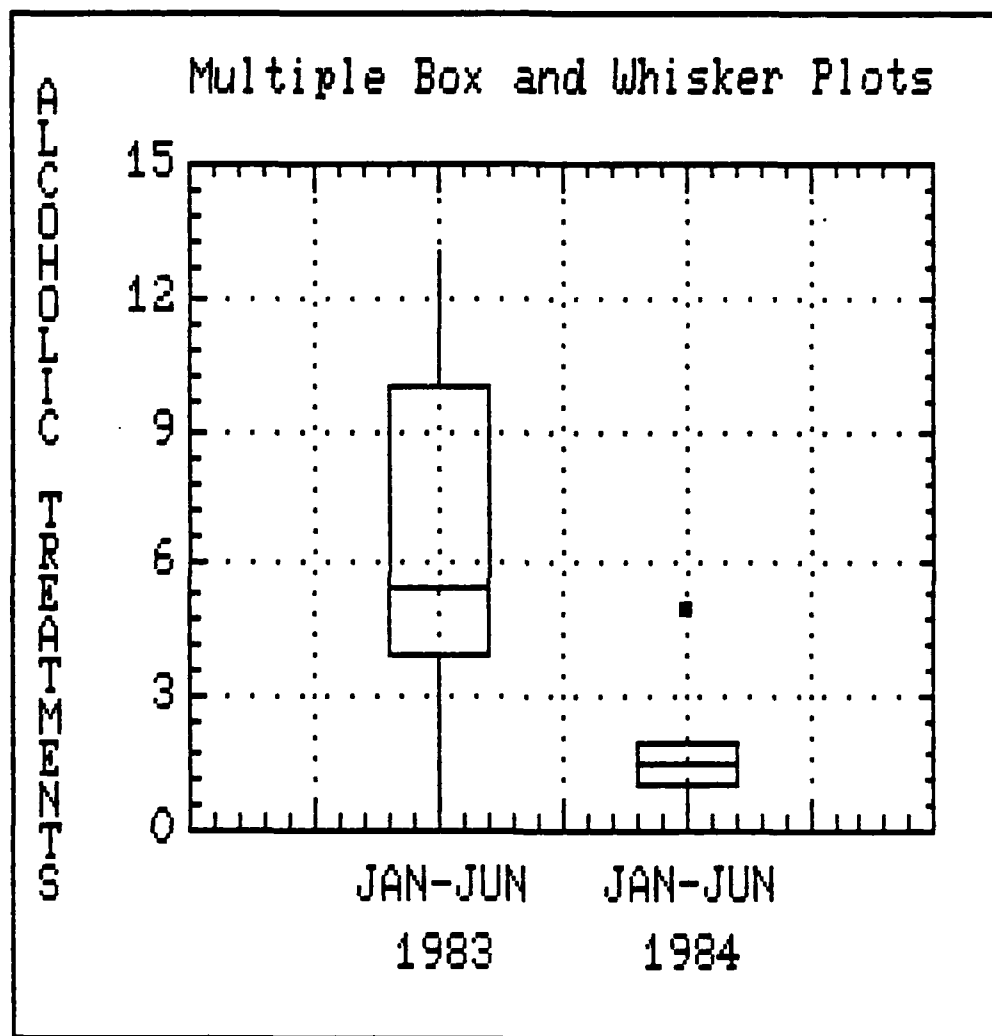


Figure 26 Alcoholic Treatments Box and Whisker Plot

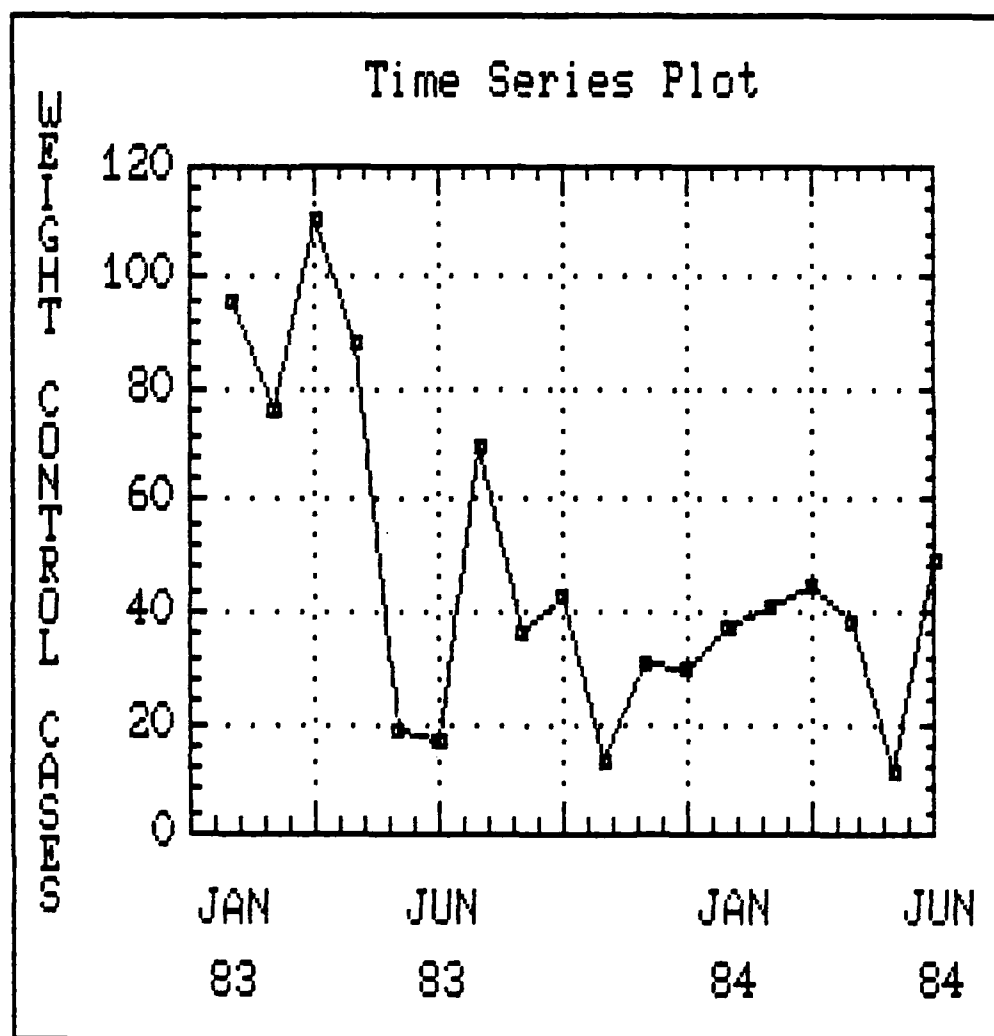


Figure 27 Weight Control Cases Time Series Plot

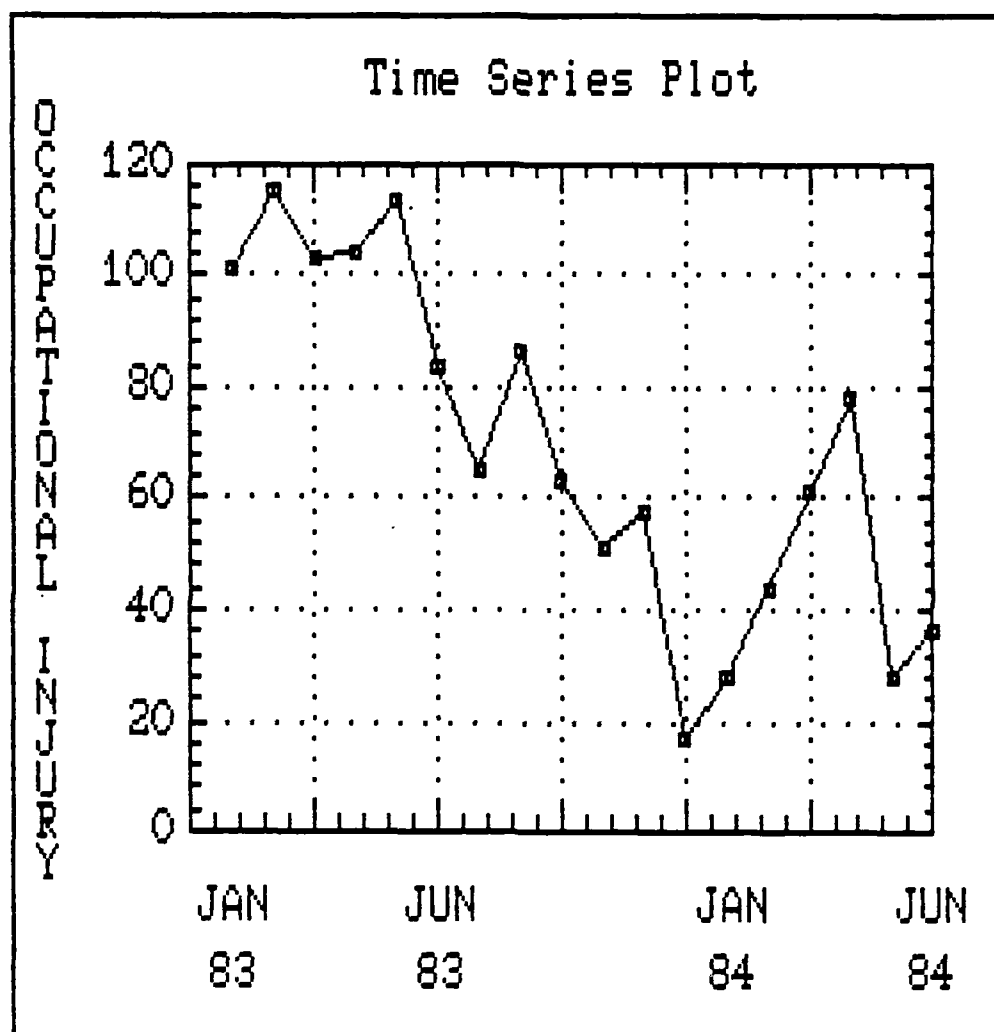


Figure 29 Occupational Injury Time Series Plot

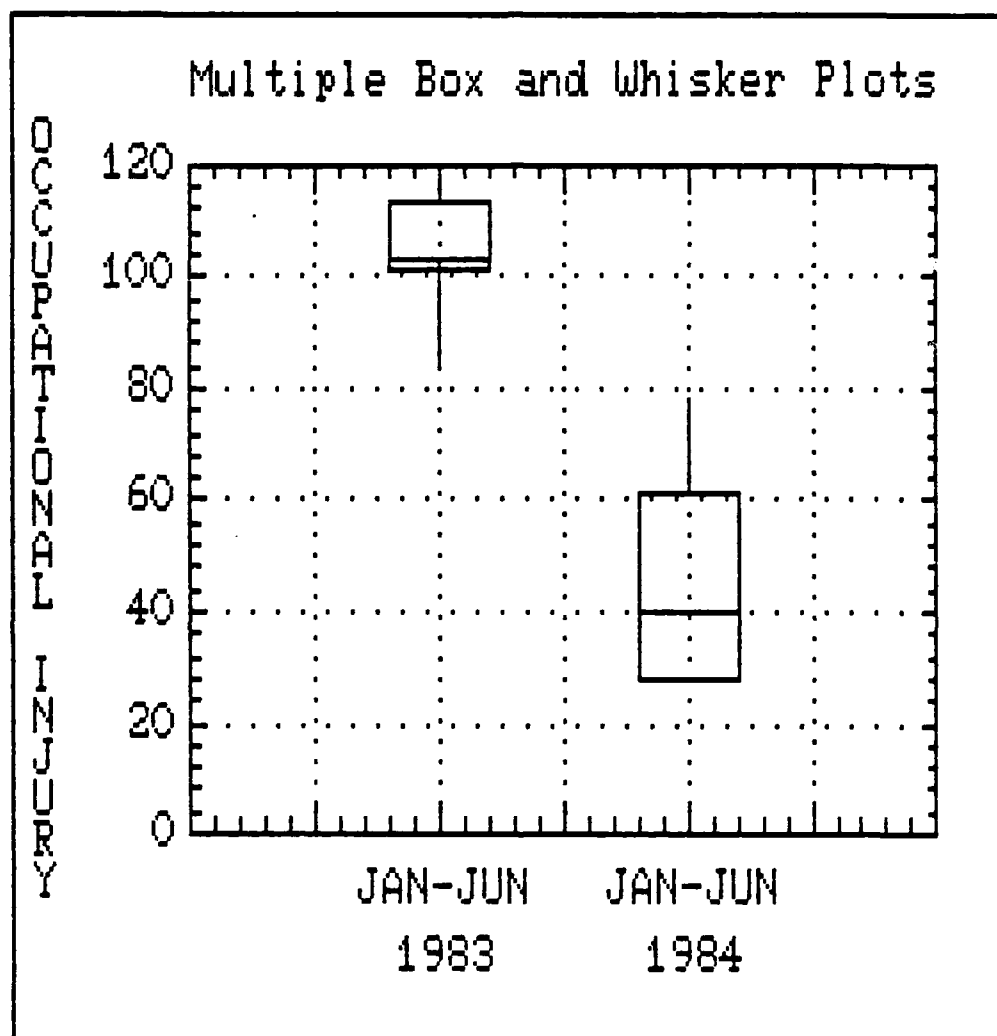


Figure 30 Occupational Injury Box and Whisker Plot

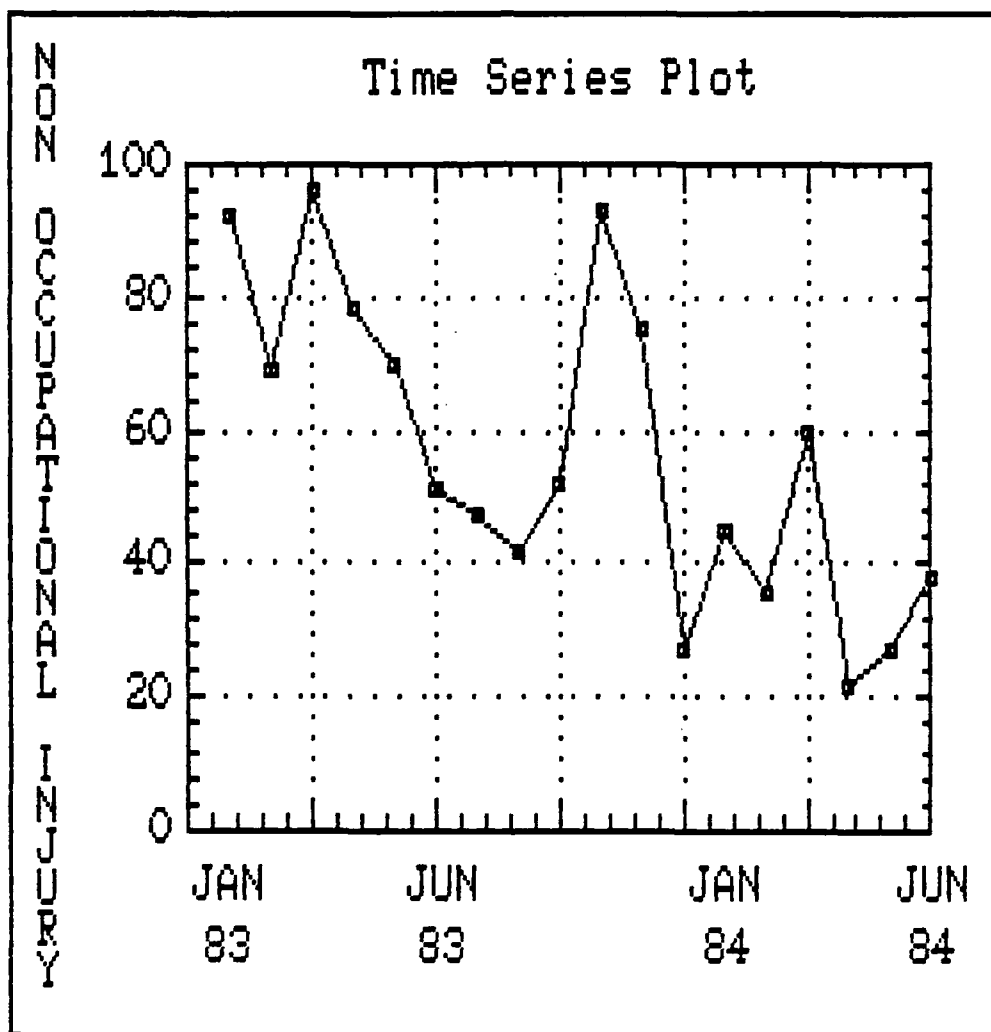


Figure 31 Non occupational Injury Time Series Plot

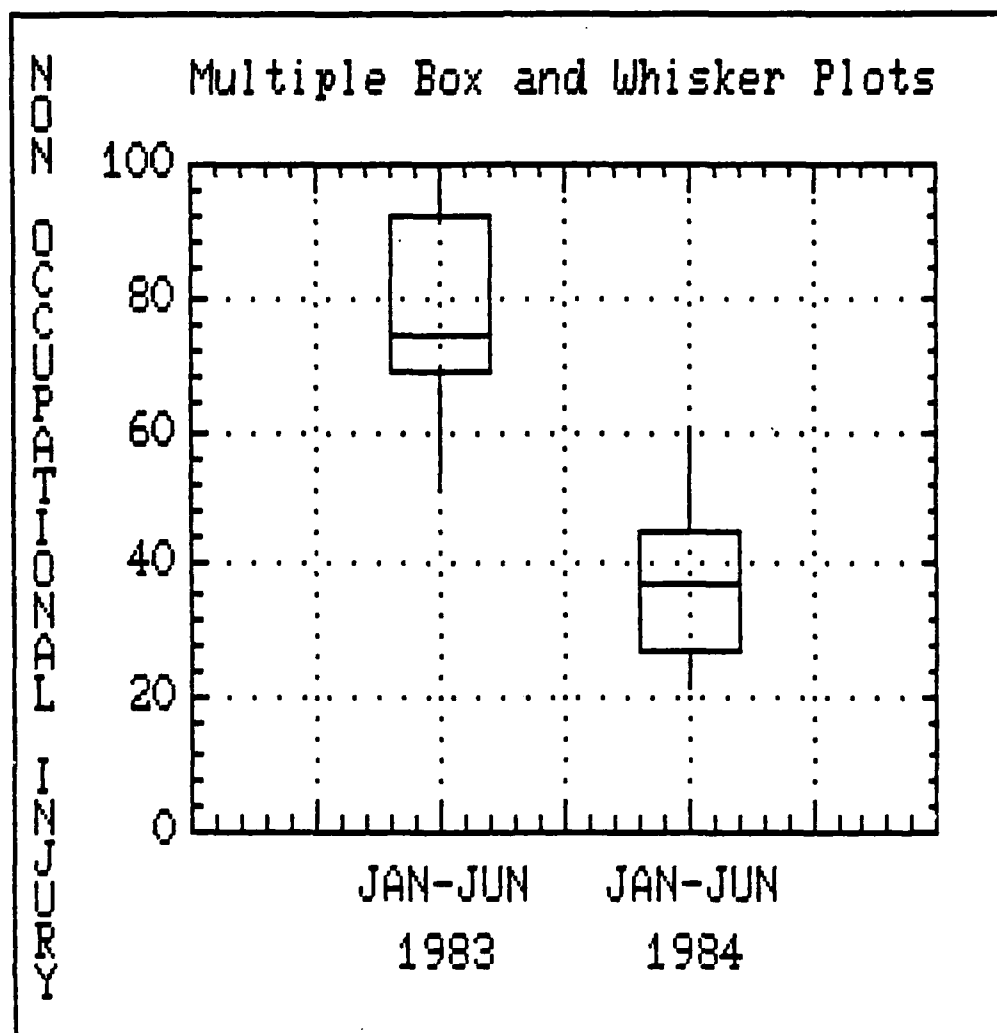


Figure 32 Non occupational Injury Box and Whisker Plot



I think it came in phases. The first measure of support was simply the historic belief I had in the importance of physical fitness. I just had a basic instinct, not only in my military career, but all my life, of the importance of physical fitness. I knew it was good for the individual. Secondly, as the program moved into phase 1, I noticed base-wide an increase in morale because of the way we put the program together. We convinced everybody that this was not another Navy PT program that would peak in about six months and then six months after that be forgotten. We convinced them that it would be this way for the rest of their life in the Navy. The salesmanship was extremely important. People got enthused and morale started to increase. It wasn't a preplanned event that the program would be done to increase morale. It just did. Morale was a by-product. Thirdly, productivity is not something I can easily quantify 1.5 years after the program, but I did have a sense that it was improving. Productivity was not one of our prime original objectives. It was a new program that we felt was good and that we would support.

2. WHAT WERE SOME OF THE SIGNS YOU SAW THAT MADE YOU FEEL THAT PRODUCTIVITY WAS ON THE UPSWING?

We were devoting a certain amount of hours to the program that we were not devoting before--so there is less time being spent on the job. In addition, people were preparing for the test and working on the remedial program. Department Heads, Division Officers and Chiefs didn't get too

upset if their people were out doing some extra exercise, even if some of that time was Navy time. Yet even with the time lost to work due to the program, the productivity did not decline. I can't say with 100% certainty that it went up, but I can say for certain that it didn't go down. I think you can call that an increase in productivity. That's the main thing I noticed.

3. DID YOU NOTICE ANY DIFFERENCE AT PERSONNEL INSPECTIONS OVER YOUR TENURE AS CO?

Without question there was an improvement in appearance, but I don't know if we can attribute that to the program or to the fact that I held regular inspections. One thing for certain, there were fewer and fewer "fat boys" as we went along. Early on, I would note six or seven unsat appearances due to weight problems at each inspection, but that dwindled down to two or three toward the end. That had to be because of the program.

4. DO YOU FEEL PRIDE, PROFESSIONALISM, AND APPEARANCE ARE FACTORS OF MORALE?

Yes, they are all interrelated, but I'm not sure that portion of the change can be attributed to the program. Talking to those who were on the remedial program, I found that they felt better, and they claimed that their productivity had gone up. I didn't talk to the average sailor who was not in the remedial program, who just participated in the testing. We have always believed in the Navy that morale does go hand in hand with productivity. We did have

some competition between departments and divisions, but we didn't emphasize this for fear of discouraging the losers.

5. DID YOU GET FEEDBACK FROM YOUR DEPARTMENT HEADS CONCERNING THESE OBSERVATIONS ABOUT THE PROGRAM?

Yes, and throughout the entire command from the lowest recruit right through to the department heads. I got the impression that there was competition and that people were striving to do their best in the fitness program.

6. IF YOU WERE ASKED BY A CONTEMPORARY, WHY YOU PUT SO MUCH ENERGY AND RESOURCES INTO THE HEALTH AND PHYSICAL READINESS PROGRAM, WHAT WOULD YOU SAY TO CONVINCE THEM THAT IT WAS WORTHWHILE?

Mostly I would just repeat what I have already said. That there was an increase in morale, that even though man-hours on the job decreased, productivity went up (or at least didn't decline) and that overall it was time well spent. I would also point out that businesses are investing in fitness programs. If it works in the civilian world it should work in ours. I would stress that pride and morale were improved.

7. DURING THE COURSE OF YOUR COMMAND, WERE THERE ANY ALTERATIONS IN MISSION REQUIREMENTS OR SIGNIFICANT LEADERSHIP CHANGES THAT MAY HAVE ACCOUNTED FOR ANY PRODUCTIVITY CHANGES?

No, there was no change in mission requirements. There were pockets where dramatic improvement was noted. The physical fitness program gave outstanding officers just one more avenue to lead and motivate their people.

8. IS THERE ANYTHING ELSE I SHOULD INCLUDE IN MY CONSIDERATION OF THE IMPACT OF THE PROGRAM?

I remember that we increased the testing intervals over what was required. It would be better for the Navy to have a stronger program than what is required. It's my perception that our more frequent testing motivated people to strive for improvement rather than just dodge an annual test. Any benefits that are derived from that program would be increased by more involvement in the program.

EXECUTIVE OFFICER: COMMANDER W. R. LOGUE, USN (RET)

Commander Logue was the Naval Air Station Pensacola Executive Officer from MAY 82 to APR 85.

1. WHY DID YOU SUPPORT THE PROGRAM WITH SUCH VIGOR AND ALLOW IT TO BE INSTITUTED THE WAY IT WAS?

My reasons for supporting the program were that I believe that a person who is physically fit will produce better results because they are healthier and therefore more capable to do their job, whether it is mental or physical. Also, a person who feels better about themselves will be more productive.

2. DURING YOUR TENURE AS XO, DO YOU FEEL YOU COULD SEE THAT THE BENEFITS YOU MENTIONED WERE ACHIEVED BECAUSE OF THE PROGRAM.

I definitely could! I could see beneficial results in the appearance of people, especially those who achieved positive results by being in the remedial program. There was a general improvement in their productivity and a general good feeling about themselves.

3. FROM THE XO POSITION, WHAT ARE SOME OF THE KEY ITEMS THAT YOU LOOK AT IN ORDER TO KEEP YOUR THUMB ON THE PRODUCTIVITY OF THE BASE?

Productivity is a pretty general term. At NAS Pensacola it's hard to define because we are basically a service oriented facility--in that we don't produce a product. The best measurement that I have is the feedback I get from those commands to whom we provide a service. The feedback that I got said that we were doing a pretty good job. Whether this improvement was due to the fitness program I really can't say, but I did see people who were involved in the program do a much better job after they improved their fitness level.

4. WAS THERE ANY OTHER PROGRAM OR MISSION REQUIREMENT THAT HAD AS GREAT AN IMPACT ON THE BASE AS THE FITNESS PROGRAM?

Our mission didn't change. There was an increased emphasis on general base cleanliness. There were some other physical fitness events that started in close proximity to the fitness program. The beginning of the Navy Open Triathlon and the Blue Angel Marathon here in Pensacola got people involved in those competitions who before our fitness program may never have even attempted such demanding activities.

5. WERE THERE ANY CHANGES IN LEADERSHIP THAT MAY HAVE IMPACTED PRODUCTIVITY FIGURES?

I can recall changes in leadership that affected the fitness program. The effects of the fitness program totally depended on those people at the top to push the program and make sure it was done right.

6. WERE YOU AND THE COMMANDING OFFICER UNIFIED ON YOUR SUPPORT OF THE PROGRAM? WERE YOUR GOALS AND OBJECTIVES THE SAME?

Yes, I think so.

7. WERE THERE ANY LEADERSHIP FACTORS THAT SHOULD BE CONSIDERED IN LOOKING AT PRODUCTIVITY OTHER THAN NORMAL TRANSFERS, ETC.?

No, I can't think of anything unusual.

8. AS YOU LOOK AT PRODUCTIVITY FACTORS, WHAT REPORTS MIGHT YOU EVALUATE TO REGULATE PRODUCTIVITY?

Productivity is hard to measure in a service organization. I don't know how you are going to measure it. Programs like the fitness program increase peoples awareness of their own well-being and may cut down on alcohol and drug abuse cases. Aircraft Intermediate Maintenance Department summaries would also be a good place to look.

9. WHAT PERSUASIVE ARGUMENT WOULD YOU USE TO CONVINCE A CONTEMPORARY THAT THE HEALTH AND PHYSICAL READINESS PROGRAM IS WORTH THE RESOURCES SPENT ON IT?

Good common sense should tell them that a healthy person will do a better job. A healthy person who is physically fit will produce more results in one eight hour day than one who is not. I firmly believe that somebody who is not physically fit is not motivated to do a good job for the Navy, for various reasons.

10. WHY DID YOU ALLOW THE PROGRAM TO BE CONDUCTED DURING THE STANDARD WORKING DAY?

Just because of my firm belief in the program. The hours devoted to improving the condition of those who failed the testing are more than recouped in the benefits gained by their improved performance later.

11. WHAT WOULD BE THE MOST OUTSTANDING BENEFIT THAT YOU WOULD LIST FROM THE PROGRAM?

The greatest benefit is to the individuals themselves. It was great to see those who were successful and how much better they felt about themselves and how much better they felt physically. Another benefit to me is discharging those people who do not meet standards and don't succeed within the six month time limit.

12. HOW DO YOU DEFEND THE DISCHARGE OF THOSE WHO FAIL AFTER THE TIME AND MONEY THE NAVY HAS INVESTED IN THEM?

Generally those people who fail the program are not very productive anyway. There will always be exceptions--there are Chiefs who are worth their weight in gold no matter what their weight is, but I really feel that a person who is physically unfit, if he is really that good a performer, will meet the standards within the time allowed.

13. IN YOUR CAREER YOU HAVE SEEN SEVERAL NAVY FITNESS PROGRAMS COME AND GO. HOW WOULD YOU EVALUATE THIS CURRENT DESIGN AND ITS PROGNOSIS FOR CONTINUANCE?

I like the program as it is now. It's practical, and the requirements are not that difficult to reach. The program at Pensacola is a good program because it is a continuous program with emphasis on staying in condition. We don't just do a test once every six months where lots of people are getting hurt. If the command is not behind it, it won't be successful. I can only base my evaluation on what I know here at Pensacola. There are probably places where it is not done very well, but I think it's great and it should continue if it is done like it is done here.

14. WHAT FEEDBACK DID YOU GET FROM OFFICERS AND SENIOR ENLISTED AS TO THE IMPACT OF THE PROGRAM ON MORALE AND PRODUCTIVITY?

The biggest thing that showed how good the program was, was the spirit that would be seen when a department went out together to take the test. Some would be in competition, others would be helping those who were having trouble. It kind of became fun for everybody instead of just the drudgery of doing a test. It went from a horrible thing to almost a fun event. There was a great increase in spirit.

15. DO YOU THINK THAT THE CURRENT DESIGN OF THE PROGRAM IS SOUND ENOUGH TO GET PEOPLE TO CHANGE THEIR LIFESTYLES AND EXERCISE MORE?

I think the testing should be more frequent. The benefit of more frequent testing would be to increase and then maintain better physical fitness by not losing the edge between tests. Some more operationally oriented commands may have trouble with this due to their time constraints.

16. IS THERE ANYTHING ELSE THAT I SHOULD CONSIDER IN EVALUATING THE IMPACT OF THE PROGRAM?

The key aspect of the program was the leadership and organization. The professional manner in which it was done saved on loss of production time. Command support and a Fitness Coordinator that has the program organized properly are the keys to success. It's hard for me to say how I would convince someone to do the program because I can't imagine anyone who doesn't believe that a physically fit person will do a better job.



## V. DISCUSSION OF RESULTS

The Health and Physical Readiness Program (HPRP) held center stage attention at the Naval Air Station in Pensacola, Florida. No other program, mission requirement or leadership change can fully account for the changes that occurred from January 1983 to June 1984. Given full command support and backing, the HPRP was destined to have a great impact on the Naval Air Station.

Wright (1982) states that physical fitness programs are considered to be effective because so many individuals believe that they are effective. Commanding Officer, Captain J. B. McKamey, and the Executive Officer, Commander W. R. Logue, emphasized this point several times in the interview data. Captain McKamey stated that he had a basic instinct concerning the importance of physical fitness. Commander Logue states that he supported the program because he believed that a person who was physically fit would produce better results because they are healthier and therefore more capable to do their job. The beliefs and perceptions of these top officers set the tone for the HPRP to be a program that was not just given lip service. Both officers were highly visible during the activities of the program and when rebellion to the program by non-participation surfaced to Captain's Mast, the offender was dealt with very sternly.

Word soon was out that the skipper meant business about this program.

In a study by Bernacki & Baurr (1984) a strong correlation was found between above average job performance and those who adhered to an exercise program. Both Captain McKamey and Commander Logue stated that they observed an increase in the morale of the personnel assigned and an improvement in the productivity. Although there may be intervening variables, none could be identified by the researcher. The data from this study seems to support the relationship between fitness and productivity.

#### A. OVERALL FITNESS

The overall fitness scores, as measured by the HPRP, increased dramatically over the eighteen months. The initial low mean of 1.7 for the April 1983 test was somewhat expected. This low score was probably caused by a combination of factors, including the newness of the test, and a population that was not dedicated to any regular fitness program. The significant gains seen between April 83 and October 83 were due partly to prior knowledge of the testing protocol, and an increased motivation to move out of the failure category after a negative comment was placed in the service record of those individuals who failed. It is important to note that the program was implemented across the board for officers and enlisted. It was quite a shock for some officers to be called to task concerning their lack of performance on

the HPRP test. Twelve months after the start of the program, the April 1984 test produced a mean score of 2.69. On a five point scale, with a population of over 900, this significant increase becomes even more noteworthy.

Horne (1975) and Donoghue (1977) have shown that a regular exercise program will reduce coronary risk factors and improve the physical condition of the participants. The data from the HPRP clearly shows an improvement in the overall fitness level of assigned personnel. Key elements in the program were:

- \* full command support,
- \* regular testing (every six months rather than just annually),
- \* remedial programs three times per week for all that fail to meet minimum standards,
- \* counseling and special guidance provided for those struggling to meet minimum standards,
- \* administrative discharge for those who did not meet minimum standards within the prescribed time period and were not showing satisfactory progress toward that goal.

The greatest benefit to the HPRP, as compared to the corporate fitness programs, is the fact that participation in the program for Navy personnel is mandatory. The results reported by Cox, Shephard & Cory (1981) concerning the influence of an employee fitness program upon fitness, productivity and absenteeism were based on a participation level of only 20%. Even with such a small percentage of the total workforce of the company, their results were positive and significant. It is no wonder that with a 100% Navy

participation rate (excluding medical waivers), that there would be tremendous gains in overall fitness.

The trend in society to endorse fitness and an active lifestyle cannot be overlooked. Even at NAS Pensacola, new events like the Navy Open Triathlon and Blue Angel Marathon were pulling people toward more active fitness endeavors. Yet the increase in overall fitness scores and the dramatic change in the median from 2 to 3 speaks for a non-competitive approach to a personal fitness program by the average sailor. There appears to be little doubt that the Health and Physical Readiness Program as conducted at the Naval Air Station in Pensacola, Florida can be seen as the major cause in the overall scores reported.

#### B. MAINTENANCE

Fabricant (1969) points out that productivity refers to a comparison between the quantity of goods and services produced and the quantity of resources employed in turning out these goods or services. This approach was taken by the researcher in evaluating the maintenance activity for the Naval Air Station. Results indicate that the workload as measured by items processed did not change significantly, but the repair turn around time and total manhours worked on maintenance decreased significantly. The simple numbers say that a constant workload was handled at a faster rate and with fewer total manhours expended over the time of the study. LT James Moreland, Quality Assurance Officer and Historian

for the Maintenance department, stated that he was aware of no special events, significant changes in leadership, or even any cyclic work patterns that could account for these findings (personal communication, 28 February 1986). The only period of time that is noted for a reduced workload is the Christmas Holidays, when the base, as a training command, has the luxury of a liberal leave policy and the majority of training operations are suspended. Although there are a great number of factors that could influence the maintenance data, there still appears to be a positive relationship between the improved overall fitness and maintenance productivity.

#### C. MEDICAL

Shephard (1984) points out that the concept of employee fitness is difficult to dissociate from the whole task of occupational health promotion. There is a widespread belief that exercise is vital for staving off disease. Physicians have noted the following benefits of exercise: increased strength and endurance, improved circulation, improved muscle tone and posture, reduction in chronic tiredness and tension, improved weight control, fewer serious accidents, and a general improvement in appearance (Goldberg, 1978). In light of these comments, the results found in this study would almost be expected, if the HPRP was having a positive impact on medical issues.

No significant difference was found in the total number of outpatient visits to the Branch Clinic, the number of

personnel assigned SIQ, or the total days spent SIQ from 1983 to 1984. Significant decreases were noted in the following areas: circulation diseases, motor vehicle accidents, alcoholic treatments, weight control cases, occupational and non-occupational injury. It is interesting to note that while the overall number of outpatient visits was relatively constant, there were reductions in the above areas as the reason for a person going to the branch clinic. Obviously, there were areas which had to show an increase. It was beyond the scope of this study to do a full analysis of the medical morbidity report. The areas chosen for study were those that would be assumed to show an impact from increased fitness level of a population. The connection of increased fitness and a reduction in weight control cases is an obvious one. As people improved their level of fitness, they were no longer listed as failures in weight control, and no longer were required to be seen by medical personnel. Yarovote, McDonagh, Goldman & Zuckerman (1974) found that better physical fitness produced favorable changes in the coronary risk factors of Exxon executives, and in theory should lead to less heart disease. The reduction in the incidence of circulatory diseases found in this study appears to offer a piece of supporting evidence to this theory. It is far beyond the scope of an aggregate study like this to say there is any more than an indication of a relationship. There are heredity factors, general health conditions, diet, and

general lifestyle that also greatly impact upon this area.

The reduction in the number of alcoholic treatments is probably more a function of the Navy's program to reduce alcohol abuse and a crackdown on drunk drivers than it is a function of the fitness program. However, there may be a link in the time spent with the Health and Physical Readiness Program that promoted new values, different social relationships, and increased emphasis on taking better care of one's body, that when combined with concurrent alcohol abuse programs led to these results. It was emphasized that a reduction in alcohol consumption was a good way to decrease caloric intake. The reduction in motor vehicle accidents represents a very complicated mix of causes and circumstances that go far beyond the scope of a general fitness statement. It would appear that the reduction in alcohol abuses and motor vehicle accidents goes hand in hand.

The significant reduction in the numbers of both occupational and non-occupational injuries is another difficult area to tie directly to the improved fitness levels. Donoghue (1977) finds that exercise participants commonly say that they have a greater capacity to work and feel more energetic and productive. Extending the concept to include that factor of increased endurance and resistance to fatigue gained from improved fitness levels, it becomes more feasible to see some relationship. The theory is that if one is more

physically fit, there will be less chance of carelessness or loss of attention to detail that often results in an accident.

The issue of fitness and medical incidents is a complex one that an aggregate count approach will only begin to explore. Individual case study and a longitudinal approach would better make the direct connection.

Shephard (1983) states that the positive change in worker performance, found in his studies, is induced for a moderate financial outlay, irrespective of whether the changes in worker performance have a specific origin. In the budget crunch era that we now operate in, it is imperative to get the greatest benefit possible for each and every dollar spent. A good fitness program, like the Health and Physical Readiness Program, is an extremely economical way to gain tremendous savings in productivity gains. Even if there is not a direct tie between fitness and the benefit, if the halo effect from the fitness program provides the benefits, then the investment appears sound.



## VI. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be drawn from the results of this study:

1. The Health and Physical Readiness Program as conducted at the Naval Air Station Pensacola was the principle cause for a significant increase in the overall fitness scores of the population. This program included a minimum of testing all hands every six months, providing mandatory remedial fitness programs for those who fail to meet minimum standards, and a counseling and education program for those who are struggling to meet minimum standards.
2. There is a positive relationship between increased physical fitness and increased productivity as measured by an increase in maintenance output for a given input of resources and a decrease in medical incident counts.
3. The positive impact felt by the Naval Air Station in relation to the Health and Physical Readiness Program was also a function of the dynamic leadership provided by the Commanding Officer and Executive Officer which created a climate of excellence in all areas of activity.
4. Command support and backing of the Health and Physical Readiness Program is critical to its success.

The following recommendations are offered for consideration and evaluation:

1. The Command Fitness Coordinator must develop a well organized, and professional program that promotes the total concept of fitness that goes beyond the minimum standards of the test.
2. There is a great need for further study in the area of fitness and productivity. This study should be amplified to include case study of individual productivity and the effect of physical fitness upon it.
3. There is a great need for more studies on fitness and productivity in the military. The military is not

constrained by a low participation percentage, as is often the case in corporate programs. There would be tremendous significance to findings where upwards of 90% of the population actively participated in a study.

4. A more thorough analysis of the medical morbidity report is needed to explain the consistent nature of outpatient visits, yet a significant decrease in several incident areas. In addition, case studies of a longitudinal nature that track patient history in an incident area would help to discover what causes seem to dominate.
5. Health and Physical Readiness Testing should be held a minimum of once per quarter. It is unlikely that the results would have been as significant as they were in this study had there only been an annual test. The more frequent the test cycle the greater the chance that the individual will develop and maintain a satisfactory fitness level rather than just squeeze by each test and then slide back into poor health and fitness habits.
6. A study needs to be conducted to test the relationship between morale and productivity in the military. Interview data strongly suggest that this is an important factor to consider.
7. The subjective area of attitude and perception as it relates to fitness and productivity needs greater study. What was it about the people on the remedial program who found success in improved fitness that they felt better about themselves and said that they were more productive?
8. A cost-benefit analysis should be conducted on the Health and Physical Readiness Program to attempt to put a dollar sign on the significant changes that were noted. For example: How much does it cost to reduce the incidence of occupational injury as compared to the costs incurred when an injury happens.
9. The overall score on the Health and Physical Readiness Test should include a measure of upper body strength.
10. Evaluation of the current policy toward administrative discharges for those who fail to meet minimum standards within the prescribed time limits should be studied from a cost-benefit point of view. What is in the best interest of the Navy?

11. There should be a better record keeping system for the retrieval of archival data from old Navy reports and functions. It was amazing how much material was not available for this study simply because records are not kept over two years.
12. There must be a better operational definition of productivity that can be measured and duplicated in various studies. Through factor analysis and a thorough conceptual framework of productivity a function of variables can be established to better study this important concept.

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# APPENDIX A

## OPNAV INSTRUCTION 6110.1B OF 19 OCTOBER 1982

RETURN TO  
CORRESPONDENCE & RECORDS

DEPARTMENT OF THE NAVY  
Office of the Chief of Naval Operations  
Washington, D.C. 20350

OPNAVINST 6110.1B  
NMPC-6H  
19 October 1982

### OPNAV INSTRUCTION 6110.1B

From: Chief of Naval Operations  
To: All Ships and Stations (less Marine Corps field addresses not having Navy personnel attached)  
Subj: Health and Physical Readiness Program  
Ref: (a) DOD Directive 1308.1 of 29 Jun 1981 (NOTAL)  
(b) MILPERSMAN 3420440  
(c) SECNAVINST 1920.6  
(d) BUPERSINST 1430.16A  
(e) MANMED 15-58 (NOTAL)  
Encl: (1) Physical Readiness Classification Table and Test Requirements  
(2) Description of Test Items  
(3) Physical Readiness Testing Responsibilities  
(4) Height-Weight Screening Tables  
(5) Landmarks for Measurements  
(6) Percent Fat Prediction in Men  
(7) Percent Fat Prediction in Women

1. Purpose. To implement a Health and Physical Readiness Program for Navy personnel that will establish minimum criteria for physical fitness and weight control standards, provide guidance for meeting minimum standards, emphasize the need for all personnel to show concern for and participate in personal life style enhancing activities, and meet the requirements of reference (a).

2. Cancellation. OPNAVINST 6110.1A and OPNAVINST 6110.3.

3. Background. The Navy community is no less susceptible to the insidious effects of sedentary jobs, excessive calorie intake, and lack of proper exercise than the civilian community. Excess body fat is a serious detriment to health, longevity, stamina and military appearance. The need to maintain a high state of health and physical readiness throughout the service is essential to ensure combat readiness and personal effectiveness.

4. Program Description. A three level program has been designed to develop and maintain health and physical fitness. Level I, where the major emphasis is placed, promotes vigorous and active health and fitness programs at the command level. These include weight control/nutrition, smoking cessation, hypertension control, stress

management and substance abuse prevention as well as exercise. Additionally, level I includes the testing of personnel against the standards outlined in enclosure (1) using the procedures described in enclosure (2). Command Fitness Coordinators will be appointed by the commanding officer to serve as advisors on health and fitness matters. COMNAVMILPERSCOM will provide commands with information pertaining to the establishment of health and physical fitness programs. Enclosure (3) lists additional responsibilities. Level II provides an educational program to improve lifestyles for those who do not meet the Navy's fitness/body fat standards and who want to change long-established health habits. Level II also includes CAAC nonresidential counseling, as appropriate. The length of a member's program at Level II should be determined by the member's commanding officer, based on advice received from the local counseling facility staff. Level III provides residential treatment for members who have been clinically evaluated and medically diagnosed as compulsive overeaters and in the opinion of their commanding officer, have potential for continued naval service. Length of treatment is normally 6 weeks and is provided at Alcohol Rehabilitation Centers.

5. Policy. All members of the Navy, except those excused for medical reasons, shall attain and maintain a condition of health and physical readiness consistent with their duties and, at a minimum, to the degree required in enclosure (1). Personnel shall be evaluated against the standards in enclosure (1) annually. Comments pertaining to outstanding performance in a physical readiness test or failure to show progress in meeting minimum test standards, when there are no medically limiting circumstances, shall be included in evaluations and reports of fitness. Remedial training will be required for those who fall below prescribed standards of physical fitness and body fat. Continued failure over a reasonable period of time to show progress in meeting minimum Navy standards, when there are no medically limiting circumstances, shall result in consideration for an administrative separation. References (b) and (c) contain administrative procedures for processing enlisted personnel and officers respectively for separation by reason of obesity. Retention of those who fail to show progress in meeting minimum Navy standards will be based on a recommendation by the commanding officer. Ultimate determination of satisfactory progress will be made by Commander, Naval Military Personnel Command (COMNAVMILPERSCOM) acting for The Chief of Naval Personnel. Reference (d) provides information regarding requirements to meet weight standards prior to advancement in rate.

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6. **Command Emphasis.** The ability of Armed Forces members to satisfactorily perform assigned responsibilities is directly influenced by that person's health status.

- A) Physical readiness to perform cannot be developed by directive. It can only be developed by personal motivation. Commanders must be aware of the very personal nature of physical readiness and provide encouragement and incentives whenever possible. Outstanding performance during physical readiness tests and substantial improvement should be rewarded with appropriate award presentations, meritorious masts, or other public recognition. Rewards should be determined locally and may take the form of certificates or letter of commendation. Commanding officers shall encourage each member of their command to become involved in a program of physical conditioning and maintenance on a regular basis. Commanding officers and commanders are enjoined to set a proper example of physical fitness themselves. In order to develop the desired level of physical fitness, individuals should exercise on a regular basis three times a week for approximately 30 minutes to a degree that provides the training effect defined in enclosure (3).

7. **Action**

- a. Commander, Naval Military Personnel Command shall be responsible for the overall administration, enforcement and management of the Health and Physical Readiness program. Specific responsibilities include:

- A) (1) Developing and providing local commands with fitness guidelines. (NMPC-6)
- A) (2) Providing information and establishing training for Command Fitness Coordinators. (NMPC-6)
- A) (3) Developing and providing an educational program to improve lifestyle for Level II of the Health and Physical Readiness Program. (NMPC-6)
- A) (4) Establishing resident and nonresident treatment centers. (NMPC-6)
- A) (5) Providing guidance and direction regarding the promotion, reenlistment, separation, transfer to the Fleet Reserve or retirement of personnel who cannot meet standards contained herein. (NMPC-2)
- A) (6) Providing an on-going evaluation of the program. (NMPC-6)

- A) b. Chief Bureau of Medicine and Surgery shall provide consulting services to the Health and Physical Readiness Program. Specific responsibilities include:

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- (1) Providing technical assistance in the implementation of the Health and Physical Readiness Program. (A)

- (2) Conducting research in lifestyle areas, including physical fitness and obesity. (A)

- (3) Providing guidance similar to that found in reference (e)) in reviewing the health status of individuals who may not be able to safely participate in testing activities. (A)

- (4) Assist in developing "exercise prescriptions" of physical activity that can be performed consistent with an individual's physical limitations and the objectives of this instruction.

- c. Commander, Naval Supply Systems Command shall provide technical assistance to local commands by:

- (1) Developing and disseminating materials and information to educate food service personnel on basic nutrition, menu planning, and food preparation. (A)

- (2) Providing guidance in menu planning and food preparation upon request of local commands. (A)

- d. Commander, Navy Recruiting Command shall ensure that all men and women recruited into the Navy understand the basic requirements contained herein.

- e. Chief of Naval Education and Training shall ensure that health and physical readiness education/training requirements identified by the Chief of Naval Operations are part of the Navy's General Military Training (GMT) program and that they are included in officer and enlisted accession training curricula under CNET jurisdiction. (A)

- f. Chief of Naval Reserve shall emphasize the objectives of this program throughout the Naval Reserve claimancy by:

- (1) Developing an implementation program compatible with the constraints of existing directives and limited Reserve training time. Optimal use of the guidelines and resources of this program is encouraged. (A)

- (2) Ensuring that all Naval Reserve personnel are regularly tested using the standards in enclosure (1). (A)

- g. Commanders responsible for conducting command inspections will ensure that the Health and Physical Readiness Programs of each command are assessed during inspections. (A)



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8. **Special Requirements.** Special requirements for certain specialized warfare occupations and training/accesion programs may require more stringent standards than those outlined herein. When the situation exists more stringent requirements can be established as long as they do not violate health safeguards of the individual.

9. **Implementation of Physical Readiness Test.** All commands shall utilize the testing criteria of enclosure (1) and institute programs to assist individuals in meeting or exceeding the requirements. During FY 83 administrative action should not be instituted or negative entries made in personnel records on the sole basis of not meeting the new Physical Readiness Test criteria. Individual responsi-

bility is expected, however, in taking positive action steps toward achieving the new standards which will be effective for compliance starting in FY 84.

10. **Report.** The requirement contained in enclosure (3) has been assigned report symbol OPNAV 6110-1 and is approved for 3 years only from the date of this instruction.

LANDO W. ZECH, JR.  
Deputy Chief of Naval Operations  
(Manpower, Personnel and Training)

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OPNAVINST 6110.1B  
PHYSICAL READINESS CLASSIFICATION TABLE AND TEST REQUIREMENTS 19 OCT 1982

CLASSIFICATION TEST	UNDER 30		30-34		35-39		40-44		45-49		50 & Older	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
<b>OUTSTANDING</b>												
1.5 MI RUN	9:45	11:30	10:00	12:00	10:30	12:30	11:00	13:00	11:30	13:30	12:00	14:00
SIT UPS	100	84	90	75	85	71	80	67	80	67	80	67
SIT REACH	+2.0	+4.0	+2.0	+3.5	+1.5	+3.0	+1.5	+3.0	+1.0	+2.0	+1.0	+2.0
PERCENT FAT	14	18	14	18	14	18	17	18	14	18	14	18
<b>EXCELLENT</b>												
1.5 MI RUN	10:45	13:00	11:00	13:30	11:30	14:00	12:00	14:30	12:30	15:00	13:00	15:30
SIT UPS	75	63	68	56	64	53	60	50	60	50	60	50
SIT REACH	+1.0	+3.0	0	+2.0	0	+1.5	0	+1.0	-0.5	+1.0	-0.5	+1.0
PERCENT FAT	16	22	16	22	16	22	16	22	16	22	16	22
<b>GOOD</b>												
1.5 MI RUN	13:00	15:00	14:00	15:30	14:30	16:00	15:00	16:30	15:30	17:00	16:00	17:30
RUN IN PLACE	330	300	325	280	300	260	300	260	280	200	280	200
SIT UPS	50	42	45	38	43	36	40	34	40	34	40	34
SIT REACH	0	+2.0	-1.0	0	-1.0	0	-1.0	0	-1.0	0	-1.0	0
PERCENT FAT	18	24	18	24	18	24	18	24	18	24	18	24
<b>SATISFACTORY</b>												
1.5 MI RUN	14:30	16:30	15:30	17:30	16:00	18:00	16:30	18:30	17:00	19:00	17:30	20:00
RUN IN PLACE	310	260	280	220	260	200	260	200	240	180	240	180
SIT UPS	36	30	34	28	32	26	30	25	30	25	30	25
SIT REACH	-1.0	0	-1.5	-0.5	-1.5	-1.0	-1.5	-1.0	-2.0	-1.5	-2.0	-1.5
PERCENT FAT	20	29	20	29	20	29	20	29	20	29	20	29
<b>MINIMUM STANDARD</b>												
1.5 MI RUN	15:00	17:00	16:00	18:00	16:30	18:30	17:00	19:00	17:30	19:30	18:00	20:30
RUN IN PLACE	280	235	250	200	230	180	230	180	210	160	210	160
SIT UPS	33	27	31	25	29	23	27	22	27	22	27	22
SIT REACH	-1.5	-0.5	-2.0	-1.0	-2.0	-1.5	-2.0	-1.5	-2.5	-2.0	-2.5	-2.0
PERCENT FAT	22	30	22	30	22	30	22	30	22	30	22	30

Classification Criteria: Only one classification applies to an individual and each individual must meet or exceed each and every criteria to achieve the classification.

Enclosure (1)

AD-A168 385

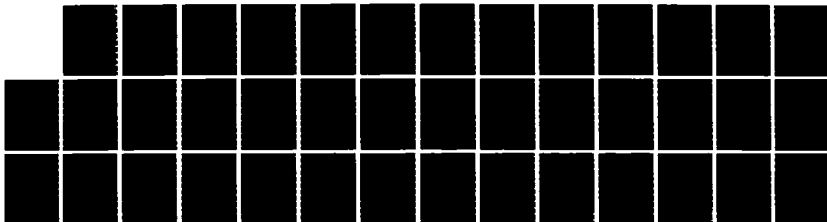
IMPACT OF A HEALTH AND PHYSICAL READINESS PROGRAM ON  
NAVAL AIR STATION PRODUCTIVITY(U) NAVAL POSTGRADUATE  
SCHOOL MONTEREY CA J A HEFLIN MAR 86

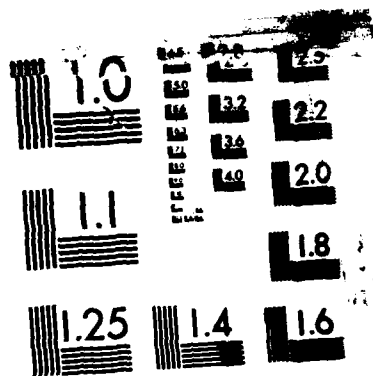
2/2

UNCLASSIFIED

F/G 6/14

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

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# DESCRIPTION OF TEST ITEMS

## 1. Stamina and cardiorespiratory endurance\*

a. Definition. The ability to persist in physical activity which demands the delivery and utilization of large amounts of oxygen.

b. 1.5 mile run-walk test. A course of 1.5 miles should be selected which is relatively free of steep inclines, surface irregularities and sharp turns. Any combination of running or walking is permitted to achieve the best time. Performances should be recorded with a stopwatch to the nearest second.

c. Run in place. May be substituted for timed distance run or walk on an individual basis whenever desired or on a unit basis where circumstances make it appropriate to do so. Run in place cannot be used to qualify for the excellent or outstanding category. The test consists of running in place with knees up and feet raised approximately 8 inches off the deck on each step. A count is made every time the left foot hits the deck. The score is the number of counts completed in three minutes.

## 2. Strength and muscular endurance\*

a. Definition. The maximum force that can be exerted in a single voluntary contraction and the ability to continue contracting a muscle or muscle group without fatigue.

### b. Sit ups

(1) Lie flat on back with knees bent, heels close to buttocks (approximately 10 inches) and arms folded across chest and feet held to floor by a partner.

(2) Curl up touching elbows to thighs.

(3) Lie back touching shoulders to floor.

(4) Repeat as many times as possible in two minutes. Timer begins with "Ready", "Set", "Go" to begin timing for all personnel being tested simultaneously.

(5) Caution. It is advisable to use a blanket or other suitable padding to prevent injuries.

\* Training Effect. Exercise, when conducted with sufficient regularity, intensity, and duration, that results in improvement in the efficiency of the cardiorespiratory system and/or muscular

Enclosure (2)

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strength and endurance. It is generally held that exercise that produces a training effect must be conducted a minimum of three times per week, preferably on alternate days, raises the member's heart rate to 60-80 percent of maximum for his or her age, and maintains the heart rate at that elevated level for 20-30 minutes.

### 3. Flexibility

a. Definition. The functional capacity of a joint to move through the range of motion.

#### b. Sit and reach test

(1) Sit on floor with legs straight, feet spread six inches apart, with shoes off.

(2) Keeping legs straight, reach as far forward as possible touching the floor between legs with fingertips of both hands. Hold the reach at least three seconds - do not bounce.

(3) Measure the distance from a line at the heels to the point of touch in inches short (e.g., -2.0 in.) or inches beyond (e.g., +2.0 in.) the line.

(4) Caution. Warm-up sufficiently by gradually stretching the back and leg muscle groups before doing the test.

### 4. Body composition (percent fat)

a. Definition. The body is composed of fat and lean weight. Body fat is expressed as a percentage of total weight.

b. Estimation of percent body fat techniques must have a correlation of .75 or better with hydrostatic weighing.

#### c. Body fat measures will be taken when:

(1) A service member exceeds the height-weight standards outlined in enclosure (4).

(2) A service member's commanding officer determines his/her appearance suggests an excess of body fat.

(3) A service member participates in the physical readiness tests.

d. The estimate and measurement of percent body fat is the responsibility of the command. Individuals who exceed the standards should be referred directly into remedial programs.

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Medical Department consultation is required only when a concomitant medical condition is suspected.

e. Recommended procedures for estimating body fat require the use of a standard tape measure. The tape should be applied to certain body landmarks (Enclosure (5)) with sufficient tension to keep it in place without indenting the skin surface. Measures should be recorded to the nearest eighth of an inch.

f. Enclosure (6) is used to estimate a man's percent body fat.

(1) The neck measurement is taken at a point just below the larynx (Adam's apple).

(2) The abdomen measurement is taken at navel, level to the deck.

(3) Enter the table with the above measures to find the percent body fat.

g. Enclosure (7) is used to estimate a woman's percent body fat.

(1) The neck measurement is taken at a point just below the larynx (Adam's apple).

(2) The abdomen measurement is taken at the navel, level to the deck.

(3) The biceps measurement is taken with the arm fully extended, level to the deck with the palm facing up. Place the tape over the largest circumference of the bicep-tricep muscle groups (upper arm).

(4) The forearm measurement is taken with the arm fully extended, level to the deck with the palm facing up. Place the tape over the largest circumference of the forearm.

(5) The thigh measurement is taken with the feet slightly apart. Place the tape just below the left buttock, around the thigh level to the deck.

(6) Convert all measurements to fat percentage points using Table II. Add the five percentage points. Subtract a correction factor of 54.598 from the total. The difference is the percent fat.

h. All percent fat values should be reported to the nearest tenth of one percent.

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PHYSICAL READINESS TESTING RESPONSIBILITIES

1. Objective. To establish minimal requirements for all Navy personnel, to provide criteria to be used in recognizing outstanding performance, and to promulgate record keeping and reporting procedures.

2. Responsibility

a. The individual is responsible for:

- (1) Achieving and maintaining a fitness level equal to, or above, prescribed minimal standards.
- (2) Taking physical readiness tests when scheduled unless excused by proper medical authority.
- (3) Utilizing resource information and the assistance of Command Fitness Coordinators in the development of personal weight control and physical fitness programs.

b. The commanding officer is responsible for:

- (1) Appointing a Command Fitness Coordinator and ensuring completion of Command Fitness Coordinator training.
- (2) Scheduling and administering physical readiness tests to all personnel.
- (3) Documenting outstanding performance results in a physical readiness test or failure to show progress in meeting prescribed standards, when there are no medically limiting circumstances, in regular fitness or evaluation reports.
- (4) Maintaining local records of individual test results which will be forwarded upon transfer to the gaining command.
- (5) Accounting and documenting individual waivers when medically necessary as determined through pre-test examination.
- (6) Monitoring progress of personnel who having failed to meet minimum standards are placed in a mandatory conditioning program and taking administrative action for unsatisfactory progress.
- (7) Encouraging and stimulating regular participation in conditioning activities to achieve and maintain satisfactory, or higher levels of physical fitness.

Enclosure (3)



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(8) Referring for assistance those who fall below prescribed standards to remedial training and Level II assistance, as appropriate.

c. Command Fitness Coordinators are responsible for:

(1) Advising the commanding officer in all Health and Physical Readiness Program matters.

(2) Advising the internal chain of command in all Health and Physical Readiness Program matters; particularly with regard to individuals who need assistance in meeting minimum standards.

(3) Ensuring proper supervision of the administration of physical readiness tests requiring organized warm-up and cool-down exercises.

(4) Counseling individuals who need assistance in meeting minimum standards and supervising mandatory conditioning program.

(5) Preparing documentation of command test results for higher authority.

(6) Maintaining updated resources for the use of all personnel interested in improving their health and physical readiness classification.

d. Chain of Command responsibilities (LPO, LCPO, DIV OFF, and DEPT HEAD):

(1) Each link in the internal chain of command must be aware of individuals who need assistance in meeting minimum standards so the below acceptable performer is identified and is counseled at every level.

(2) Providing leadership to stimulate and promote increased levels of health and physical fitness.

e. Medical officers are responsible for:

(1) Reviewing the health status prior to testing of each individual over age 40 and those with indications of existing medical conditions which might interfere with their ability to complete the testing requirement safely.

(2) Recommending waivers for personnel with medically limiting defects who shall be placed in a physical fitness program consistent with their limitations.

Enclosure (3)

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(3) Coordinating with Command Fitness Coordinator's to ensure that participants in testing activities are cautioned against potential dangers of injury due to improper execution of an exercise and forewarning personnel to dress properly, report injuries, replace fluids, to warm-up and cool down before participation begins.

f. Based on guidance from COMNAVMILPERSCOM, second echelon commanders will task selected units to report the physical condition of their personnel in the following categories: total number personnel assigned; total number accomplishing physical fitness standards; total number meeting weight control standards; total number waived for physical fitness test. This data will be reported as of 30 September of each year and is assigned OPNAV report symbol 6110-1.

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HEIGHT-WEIGHT SCREENING TABLES

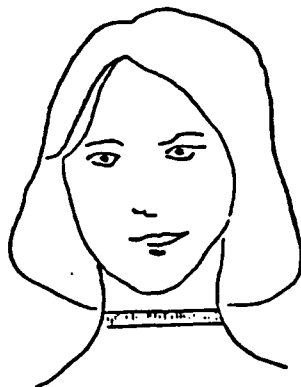
<u>HEIGHT</u>	<u>MEN</u>		<u>WOMEN</u>	
	<u>MINIMUM</u>	<u>MAXIMUM</u>	<u>MINIMUM</u>	<u>MAXIMUM</u>
4' 10"			87	126
4' 11"			89	128
5' 0"	100	153	92	130
5' 1"	102	155	95	132
5' 2"	103	158	97	134
5' 3"	104	160	100	136
5' 4"	105	164	103	139
5' 5"	106	169	106	144
5' 6"	109	174	108	148
5' 7"	111	179	111	152
5' 8"	115	184	114	156
5' 9"	119	189	117	161
5' 10"	123	194	119	165
5' 11"	127	199	122	169
6' 0"	131	205	125	174
6' 1"	135	211	128	179
6' 2"	139	218	130	185
6' 3"	143	224	133	190
6' 4"	147	230	136	196
6' 5"	151	236	139	201
6' 6"	153	242	141	206
6' 7"	157	248	144	211
6' 8"	161	254	147	216

Enclosure (4)

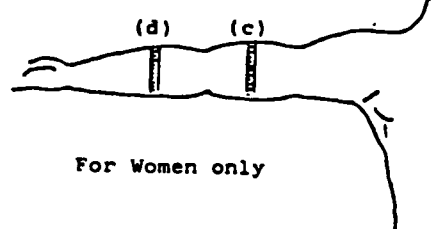
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LANDMARKS FOR MEASUREMENTS\*

(a) Neck Girth  
For Men and Women

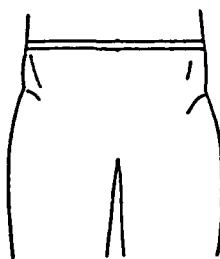


Arm and Forearm Girth



For Women only

(b) Abdomen #2 Girth  
For Men and Women  
(at Navel)



For Women only

(e)  
Thigh Girth



\*See Enclosure (2), pg. 2 for complete directions on taking of measurements.

Enclosure (5)

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Table I  
PERCENT FAT PREDICTION IN MEN  
FROM  
ABDOMEN AND NECK MEASUREMENTS

	NECK (IN.)								
ABDOMEN (IN.)	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75	15.00
25.0	6.3	5.5	4.7	3.9	3.1	2.3	1.5	.7	
25.5	7.2	6.4	5.6	4.8	4.0	3.3	2.5	1.7	.9
26.0	8.2	7.4	6.6	5.8	5.0	4.2	3.4	2.6	1.8
26.5	9.1	8.3	7.5	6.7	5.9	5.1	4.3	3.5	2.8
27.0	10.0	9.2	8.4	7.7	6.9	6.1	5.3	4.5	3.7
27.5	11.0	10.2	9.4	8.6	7.8	7.0	6.2	5.4	4.6
28.0	11.9	11.1	10.3	9.5	8.7	7.9	7.2	6.4	5.6
28.5	12.9	12.1	11.3	10.5	9.7	8.9	8.1	7.3	6.5
29.0	13.8	13.0	12.2	11.4	10.6	9.8	9.0	8.2	7.4
29.5	14.7	13.9	13.1	12.4	11.6	10.8	10.0	9.2	8.4
30.0	15.7	14.9	14.1	13.3	12.5	11.7	10.9	10.1	9.3
30.5	16.6	15.8	15.0	14.2	13.4	12.6	11.8	11.1	10.3
31.0	17.6	16.8	16.0	15.2	14.4	13.6	12.8	12.0	11.2
31.5	18.5	17.7	16.9	16.1	15.3	14.5	13.7	12.9	12.1
32.0	19.4	18.6	17.8	17.1	16.3	15.5	14.7	13.9	13.1
32.5	20.4	19.6	18.8	18.0	17.2	16.4	15.6	14.8	14.0
33.0	21.3	20.5	19.7	18.9	18.1	17.3	16.6	15.8	15.0
33.5	22.3	21.5	20.7	19.9	19.1	18.3	17.5	16.7	15.9
34.0	23.2	22.4	21.6	20.8	20.0	19.2	18.4	17.6	16.8
34.5	24.1	23.3	22.5	21.8	21.0	20.2	19.4	18.6	17.8
35.0	25.1	24.3	23.5	22.7	21.9	21.1	20.3	19.5	18.7
35.5	26.0	25.2	24.4	23.6	22.8	22.0	21.3	20.5	19.7
36.0	27.0	26.2	25.4	24.6	23.8	23.0	22.2	21.4	20.6
36.5	27.9	27.1	26.3	25.5	24.7	23.9	23.1	22.3	21.5
37.0	28.8	28.0	27.2	26.5	25.7	24.9	24.1	23.3	22.5
37.5	29.8	29.0	28.2	27.4	26.6	25.8	25.0	24.2	23.4
38.0	30.7	29.9	29.1	28.3	27.5	26.7	26.0	25.2	24.4
38.5	31.7	30.9	30.1	29.3	28.5	27.7	26.9	26.1	25.3
39.0	32.6	31.8	31.0	30.2	29.4	28.6	27.8	27.0	26.2
39.5	33.5	32.7	31.9	31.2	30.4	29.6	28.8	28.0	27.2
40.0	34.5	33.7	32.9	32.1	31.3	30.5	29.7	28.9	28.1
40.5	35.4	34.6	33.8	33.0	32.2	31.4	30.7	29.9	29.1
41.0	36.3	35.6	34.8	34.0	33.2	32.4	31.6	30.8	30.0
41.5	37.3	36.5	35.7	34.9	34.1	33.3	32.5	31.7	30.9
42.0	38.2	37.4	36.6	35.8	35.1	34.3	33.5	32.7	31.9
42.5	39.2	38.4	37.6	36.8	36.0	35.2	34.4	33.6	32.8
43.0	40.1	39.3	38.5	37.7	36.9	36.1	35.4	34.6	33.8
43.5	41.0	40.3	39.5	38.7	37.9	37.1	36.3	35.5	34.7
44.0	42.0	41.2	40.4	39.6	38.8	38.0	37.2	36.4	35.6
44.5	42.9	42.1	41.3	40.5	39.7	39.0	38.2	37.4	36.6
45.0	43.9	43.1	42.3	41.5	40.7	39.9	39.1	38.3	37.5
45.5	44.8	44.0	43.2	42.4	41.6	40.8	40.0	39.3	38.5
46.0	45.7	45.0	44.2	43.4	42.6	41.8	41.0	40.2	39.4
46.5	46.7	45.9	45.1	44.3	43.5	42.7	41.9	41.1	40.3
47.0	47.6	46.8	46.0	45.2	44.5	43.7	42.9	42.1	41.3
47.5	48.6	47.8	47.0	46.2	45.4	44.6	43.8	43.0	42.2
48.0	49.5	48.7	47.9	47.1	46.3	45.5	44.7	44.0	43.2
48.5	50.4	49.7	48.9	48.1	47.3	46.5	45.7	44.9	44.1
49.0	51.4	50.6	49.8	49.0	48.2	47.4	46.6	45.8	45.0
49.5	52.3	51.5	50.7	49.9	49.2	48.4	47.6	46.8	46.0
50.0	53.3	52.5	51.7	50.9	50.1	49.3	48.5	47.7	46.9

Enclosure (6)

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Table I  
PERCENT FAT PREDICTION IN MEN  
FROM  
ABDOMEN AND NECK MEASUREMENTS

ABDOMEN (IN.)	NECK (IN.)								
	15.25	15.50	15.75	16.00	16.25	16.50	16.75	17.00	17.25
25.0									
25.5	.1								
26.0	1.0	.2							
26.5	2.0	1.2	.4						
27.0	2.9	2.1	1.3	.5					
27.5	3.8	3.0	2.3	1.5	.7				
28.0	4.8	4.0	3.2	2.4	1.6	.8	.0		
28.5	5.7	4.9	4.1	3.3	2.5	1.8	1.0	.2	
29.0	6.7	5.9	5.1	4.3	3.5	2.7	1.9	1.1	.3
29.5	7.6	6.8	6.0	5.2	4.4	3.6	2.8	2.0	1.3
30.0	8.5	7.7	6.9	6.2	5.4	4.6	3.8	3.0	2.2
30.5	9.5	8.7	7.9	7.1	6.3	5.5	4.7	3.9	3.1
31.0	10.4	9.6	8.8	8.0	7.2	6.5	5.7	4.9	4.1
31.5	11.4	10.6	9.8	9.0	8.2	7.4	6.6	5.8	5.0
32.0	12.3	11.5	10.7	9.9	9.1	8.3	7.5	6.7	6.0
32.5	13.2	12.4	11.6	10.9	10.1	9.3	8.5	7.7	6.9
33.0	14.2	13.4	12.6	11.8	11.0	10.2	9.4	8.6	7.8
33.5	15.1	14.3	13.5	12.7	11.9	11.1	10.4	9.6	8.8
34.0	16.1	15.3	14.5	13.7	12.9	12.1	11.3	10.5	9.7
34.5	17.0	16.2	15.4	14.6	13.8	13.0	12.2	11.4	10.6
35.0	17.9	17.1	16.3	15.6	14.8	14.0	13.2	12.4	11.6
35.5	18.9	18.1	17.3	16.5	15.7	14.9	14.1	13.3	12.5
36.0	19.8	19.0	18.2	17.4	16.6	15.8	15.1	14.3	13.5
36.5	20.8	20.0	19.2	18.4	17.6	16.8	16.0	15.2	14.4
37.0	21.7	20.9	20.1	19.3	18.5	17.7	16.9	16.1	15.3
37.5	22.6	21.8	21.0	20.3	19.5	18.7	17.9	17.1	16.3
38.0	23.6	22.8	22.0	21.2	20.4	19.6	18.8	18.0	17.2
38.5	24.5	23.7	22.9	22.1	21.3	20.5	19.8	19.0	18.2
39.0	25.5	24.7	23.9	23.1	22.3	21.5	20.7	19.9	19.1
39.5	26.4	25.6	24.8	24.0	23.2	22.4	21.6	20.8	20.0
40.0	27.3	26.5	25.7	25.0	24.2	23.4	22.6	21.8	21.0
40.5	28.3	27.5	26.7	25.9	25.1	24.3	23.5	22.7	21.9
41.0	29.2	28.4	27.6	26.8	26.0	25.2	24.5	23.7	22.9
41.5	30.2	29.4	28.6	27.8	27.0	26.2	25.4	24.6	23.8
42.0	31.1	30.3	29.5	28.7	27.9	27.1	26.3	25.5	24.7
42.5	32.0	31.2	30.4	29.7	28.9	28.1	27.3	26.5	25.7
43.0	33.0	32.2	31.4	30.6	29.8	29.0	28.2	27.4	26.6
43.5	33.9	33.1	32.3	31.5	30.7	29.9	29.2	28.4	27.6
44.0	34.9	34.1	33.3	32.5	31.7	30.9	30.1	29.3	28.5
44.5	35.8	35.0	34.2	33.4	32.6	31.8	31.0	30.2	29.4
45.0	36.7	35.9	35.1	34.4	33.6	32.8	32.0	31.2	30.4
45.5	37.7	36.9	36.1	35.3	34.5	33.7	32.9	32.1	31.3
46.0	38.6	37.8	37.0	36.2	35.4	34.6	33.8	33.1	32.3
46.5	39.5	38.8	38.0	37.2	36.4	35.6	34.8	34.0	33.2
47.0	40.5	39.7	38.9	38.1	37.3	36.5	35.7	34.9	34.1
47.5	41.4	40.6	39.8	39.0	38.3	37.5	36.7	35.9	35.1
48.0	42.4	41.6	40.8	40.0	39.2	38.4	37.6	36.8	36.0
48.5	43.3	42.5	41.7	40.9	40.1	39.3	38.5	37.7	37.0
49.0	44.2	43.5	42.7	41.9	41.1	40.3	39.5	38.7	37.9
49.5	45.2	44.4	43.6	42.8	42.0	41.2	40.4	39.6	38.8
50.0	46.1	45.3	44.5	43.7	43.0	42.2	41.4	40.6	39.8

Enclosure (A)

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Table I  
PERCENT FAT PREDICTION IN MEN  
FROM  
ABDOMEN AND NECK MEASUREMENTS

		NECK (IN.)									
ABDOMEN (IN.)	17.50	17.75	18.00	18.25	18.50	18.75	19.00	19.25	19.50	19.75	
29.5	.5										
30.0	1.4	.6									
30.5	2.3	1.5	.8								
31.0	3.3	2.5	1.7	.9	.1						
31.5	4.2	3.4	2.6	1.8	1.0	.3					
32.0	5.2	4.4	3.6	2.8	2.0	1.2	.4				
32.5	6.1	5.3	4.5	3.7	2.9	2.1	1.3	.5			
33.0	7.0	6.2	5.5	4.7	3.9	3.1	2.3	1.5	.7		
33.5	8.0	7.2	6.4	5.6	4.8	4.0	3.2	2.4	1.6	.8	
34.0	8.9	8.1	7.3	6.5	5.7	5.0	4.2	3.4	2.6	1.8	
34.5	9.9	9.1	8.3	7.5	6.7	5.9	5.1	4.3	3.5	2.7	
35.0	10.8	10.0	9.2	8.4	7.6	6.8	6.0	5.2	4.5	3.7	
35.5	11.7	10.9	10.1	9.4	8.6	7.8	7.0	6.2	5.4	4.6	
36.0	12.7	11.9	11.1	10.3	9.5	8.7	7.9	7.1	6.3	5.5	
36.5	13.6	12.8	12.0	11.2	10.4	9.6	8.9	8.1	7.3	6.5	
37.0	14.6	13.8	13.0	12.2	11.4	10.6	9.8	9.0	8.2	7.4	
37.5	15.5	14.7	13.9	13.1	12.3	11.5	10.7	9.9	9.2	8.4	
38.0	16.4	15.6	14.8	14.1	13.3	12.5	11.7	10.9	10.1	9.3	
38.5	17.4	16.6	15.8	15.0	14.2	13.4	12.6	11.8	11.0	10.2	
39.0	18.3	17.5	16.7	15.9	15.1	14.3	13.6	12.8	12.0	11.2	
39.5	19.3	18.5	17.7	16.9	16.1	15.3	14.5	13.7	12.9	12.1	
40.0	20.2	19.4	18.6	17.8	17.0	16.2	15.4	14.6	13.8	13.1	
40.5	21.1	20.3	19.5	18.8	18.0	17.2	16.4	15.6	14.8	14.0	
41.0	22.1	21.3	20.5	19.7	18.9	18.1	17.3	16.5	15.7	14.9	
41.5	23.0	22.2	21.4	20.6	19.8	19.0	18.3	17.5	16.7	15.9	
42.0	24.0	23.2	22.4	21.6	20.8	20.0	19.2	18.4	17.6	16.8	
42.5	24.9	24.1	23.3	22.5	21.7	20.9	20.1	19.3	18.5	17.8	
43.0	25.8	25.0	24.2	23.5	22.7	21.9	21.1	20.3	19.5	18.7	
43.5	26.8	26.0	25.2	24.4	23.6	22.8	22.0	21.2	20.4	19.6	
44.0	27.7	26.9	26.1	25.3	24.5	23.7	23.0	22.2	21.4	20.6	
44.5	28.7	27.9	27.1	26.3	25.5	24.7	23.9	23.1	22.3	21.5	
45.0	29.6	28.8	28.0	27.2	26.4	25.6	24.8	24.0	23.2	22.5	
45.5	30.5	29.7	28.9	28.2	27.4	26.6	25.8	25.0	24.2	23.4	
46.0	31.5	30.7	29.9	29.1	28.3	27.5	26.7	25.9	25.1	24.3	
46.5	32.4	31.6	30.8	30.0	29.2	28.4	27.7	26.9	26.1	25.3	
47.0	33.4	32.6	31.8	31.0	30.2	29.4	28.6	27.8	27.0	26.2	
47.5	34.3	33.5	32.7	31.9	31.1	30.3	29.5	28.7	27.9	27.2	
48.0	35.2	34.4	33.6	32.9	32.1	31.3	30.5	29.7	29.0	28.1	
48.5	36.2	35.4	34.6	33.8	33.0	32.2	31.4	30.6	29.8	29.0	
49.0	37.1	36.3	35.5	34.7	33.9	33.1	32.4	31.6	30.8	30.0	
49.5	38.1	37.3	36.5	35.7	34.9	34.1	33.3	32.5	31.7	30.9	
50.0	39.0	38.2	37.4	36.6	35.8	35.0	34.2	33.4	32.6	31.9	

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TABLE II  
PERCENT FAT PREDICTION IN WOMEN

THIGH	PTS	THIGH	PTS	THIGH	PTS	THIGH	PTS	THIGH	PTS
11 6/8	.0	16 2/8	7.0	20 6/8	13.7	25 2/8	20.5	29 6/8	27.3
11 7/8	.2	16 3/8	7.1	20 7/8	13.9	25 3/8	20.7	29 7/8	27.5
12 0/8	.4	16 4/8	7.3	21 0/8	14.1	25 4/8	20.9	30 0/8	27.7
12 1/8	.6	16 5/8	7.4	21 1/8	14.3	25 5/8	21.1	30 1/8	27.9
12 2/8	.8	16 6/8	7.6	21 2/8	14.5	25 6/8	21.3	30 2/8	28.1
12 3/8	1.0	16 7/8	7.8	21 3/8	14.6	25 7/8	21.5	30 3/8	28.3
12 4/8	1.2	17 0/8	8.0	21 4/8	14.8	26 0/8	21.7	30 4/8	28.5
12 5/8	1.4	17 1/8	8.2	21 5/8	15.0	26 1/8	21.8	30 5/8	28.7
12 6/8	1.6	17 2/8	8.4	21 6/8	15.2	26 2/8	22.0	30 6/8	28.9
12 7/8	1.8	17 3/8	8.6	21 7/8	15.4	26 3/8	22.2	31 0/8	29.2
13 0/8	1.9	17 4/8	8.8	22 0/8	15.6	26 4/8	22.4	31 1/8	29.4
13 1/8	2.1	17 5/8	9.0	22 1/8	15.8	26 5/8	22.6	31 2/8	29.6
13 2/8	2.3	17 6/8	9.1	22 2/8	16.0	26 6/8	22.8	31 3/8	29.8
13 3/8	2.5	17 7/8	9.3	22 3/8	16.2	26 7/8	23.0	31 4/8	30.0
13 4/8	2.7	18 0/8	9.5	22 4/8	16.3	27 0/8	23.2	31 5/8	30.2
13 5/8	2.9	18 1/8	9.7	22 5/8	16.5	27 1/8	23.4	31 6/8	30.4
13 6/8	3.1	18 2/8	9.9	22 6/8	16.7	27 2/8	23.6	31 7/8	30.6
13 7/8	3.3	18 3/8	10.1	22 7/8	16.9	27 3/8	23.7	32 0/8	30.8
14 0/8	3.5	18 4/8	10.3	23 0/8	17.1	27 4/8	23.9	32 1/8	30.9
14 1/8	3.6	18 5/8	10.5	23 1/8	17.3	27 5/8	24.1	32 2/8	31.1
14 2/8	3.8	18 6/8	10.7	23 2/8	17.5	27 6/8	24.3	32 3/8	31.3
14 3/8	4.0	18 7/8	10.9	23 3/8	17.7	27 7/8	24.5	32 4/8	31.5
14 4/8	4.2	19 0/8	11.0	23 4/8	17.9	28 0/8	24.7	32 5/8	31.7
14 5/8	4.4	19 1/8	11.2	23 5/8	18.1	28 1/8	24.9	32 6/8	31.9
14 6/8	4.6	19 2/8	11.4	23 6/8	18.2	28 2/8	25.1	32 7/8	32.1
14 7/8	4.8	19 3/8	11.6	23 7/8	18.4	28 3/8	25.3	33 0/8	32.3
15 0/8	5.0	19 4/8	11.8	24 0/8	18.6	28 4/8	25.4	33 1/8	32.5
15 1/8	5.2	19 5/8	12.0	24 1/8	18.8	28 5/8	25.6	33 2/8	32.7
15 2/8	5.4	19 6/8	12.2	24 2/8	19.0	28 6/8	25.8	33 3/8	32.8
15 3/8	5.5	19 7/8	12.4	24 3/8	19.2	28 7/8	26.0	33 4/8	32.9
15 4/8	5.7	20 0/8	12.6	24 4/8	19.4	29 0/8	26.2		
15 5/8	5.9	20 1/8	12.7	24 5/8	19.6	29 1/8	26.4		
15 6/8	6.1	20 2/8	12.9	24 6/8	19.8	29 2/8	26.6		
16 7/8	6.3	20 3/8	13.1	24 7/8	20.0	29 3/8	26.8		
16 0/8	6.5	20 4/8	13.3	25 0/8	20.1	29 4/8	27.0		
16 1/8	6.7	20 5/8	13.5	25 1/8	20.3	29 5/8	27.2		

Enclosure (7)



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TABLE II  
PERCENT FAT PREDICTION IN WOMEN

ABDOMEN	PTS	ABDOMEN	PTS	ABDOMEN	PTS	ABDOMEN	PTS	ABDOMEN	PTS	ABDOMEN	PTS
17 5/8	.0	23 0/8	4.4	28 3/8	8.9	33 6/8	13.3	39 1/8	17.8	44 4/8	22.2
17 6/8	.1	23 1/8	4.5	28 4/8	9.0	33 7/8	13.4	39 2/8	17.9	44 5/8	22.3
17 8/8	.2	23 2/8	4.6	28 5/8	9.1	34 0/8	13.5	39 3/8	18.0	44 6/8	22.4
18 0/8	.3	23 3/8	4.7	28 6/8	9.2	34 1/8	13.6	39 4/8	18.1	44 7/8	22.5
18 1/8	.4	23 4/8	4.8	28 7/8	9.3	34 2/8	13.7	39 5/8	18.2	45 0/8	22.6
18 2/8	.5	23 5/8	4.9	29 0/8	9.4	34 3/8	13.8	39 6/8	18.3	45 1/8	22.7
18 3/8	.6	23 6/8	5.0	29 1/8	9.5	34 4/8	14.0	39 7/8	18.4	45 2/8	22.9
18 4/8	.7	23 7/8	5.2	29 2/8	9.6	34 5/8	14.1	40 0/8	18.5	45 3/8	23.0
18 5/8	.8	24 0/8	5.3	29 3/8	9.7	34 6/8	14.2	40 1/8	18.6	45 4/8	23.1
18 6/8	.9	24 1/8	5.4	29 4/8	9.8	34 7/8	14.3	40 2/8	18.7	45 5/8	23.2
18 7/8	1.0	24 2/8	5.5	29 5/8	9.9	35 0/8	14.4	40 3/8	18.8	45 6/8	23.3
19 0/8	1.1	24 3/8	5.6	29 6/8	10.0	35 1/8	14.5	40 4/8	18.9	45 7/8	23.4
19 1/8	1.2	24 4/8	5.7	29 7/8	10.1	35 2/8	14.6	40 5/8	19.0	46 0/8	23.5
19 2/8	1.3	24 5/8	5.8	30 0/8	10.2	35 3/8	14.7	40 6/8	19.1	46 1/8	23.6
19 3/8	1.4	24 6/8	5.9	30 1/8	10.3	35 4/8	14.8	40 7/8	19.2	46 2/8	23.7
19 4/8	1.5	24 7/8	6.0	30 2/8	10.4	35 5/8	14.9	41 0/8	19.3	46 3/8	23.8
19 5/8	1.6	25 0/8	6.1	30 3/8	10.5	35 6/8	15.0	41 1/8	19.4	46 4/8	23.9
19 6/8	1.7	25 1/8	6.2	30 4/8	10.6	35 7/8	15.1	41 2/8	19.5	46 5/8	24.0
19 7/8	1.8	25 2/8	6.3	30 5/8	10.7	36 0/8	15.2	41 3/8	19.6	46 6/8	24.1
20 0/8	1.9	25 3/8	6.4	30 6/8	10.8	36 1/8	15.3	41 4/8	19.7	46 7/8	24.2
20 1/8	2.0	25 4/8	6.5	30 7/8	10.9	36 2/8	15.4	41 5/8	19.9	47 0/8	24.3
20 2/8	2.2	25 5/8	6.6	31 0/8	11.1	36 3/8	15.5	41 6/8	20.0	47 1/8	24.4
20 3/8	2.3	25 6/8	6.7	31 1/8	11.2	36 4/8	15.6	41 7/8	20.1	47 2/8	24.5
20 4/8	2.4	25 7/8	6.8	31 2/8	11.3	36 5/8	15.7	42 0/8	20.2	47 3/8	24.6
20 5/8	2.5	26 0/8	6.9	31 3/8	11.4	36 6/8	15.8	42 1/8	20.3	47 4/8	24.7
20 6/8	2.6	26 1/8	7.0	31 4/8	11.5	36 7/8	15.9	42 2/8	20.4	47 5/8	24.8
20 7/8	2.7	26 2/8	7.1	31 5/8	11.6	37 0/8	16.0	42 3/8	20.5	47 6/8	24.9
21 0/8	2.8	26 3/8	7.2	31 6/8	11.7	37 1/8	16.1	42 4/8	20.6	47 7/8	25.0
21 1/8	2.9	26 4/8	7.3	31 7/8	11.8	37 2/8	16.2	42 5/8	20.7	48 0/8	25.1
21 2/8	3.0	26 5/8	7.4	32 0/8	11.9	37 3/8	16.3	42 6/8	20.8	48 1/8	25.2
21 3/8	3.1	26 6/8	7.5	32 1/8	12.0	37 4/8	16.4	42 7/8	20.9	48 2/8	25.3
21 4/8	3.2	26 7/8	7.6	32 2/8	12.1	37 5/8	16.5	43 0/8	21.0	48 3/8	25.4
21 5/8	3.3	27 0/8	7.7	32 3/8	12.2	37 6/8	16.6	43 1/8	21.1	48 4/8	25.5
21 6/8	3.4	27 1/8	7.8	32 4/8	12.3	37 7/8	16.7	43 2/8	21.2	48 5/8	25.6
21 7/8	3.5	27 2/8	7.9	32 5/8	12.4	38 0/8	16.8	43 3/8	21.3	48 6/8	25.8
22 0/8	3.6	27 3/8	8.1	32 6/8	12.5	38 1/8	17.0	43 4/8	21.4	48 7/8	25.9
22 1/8	3.7	27 4/8	8.2	32 7/8	12.6	38 2/8	17.1	43 5/8	21.5	49 0/8	26.0
22 2/8	3.8	27 5/8	8.3	33 0/8	12.7	38 3/8	17.2	43 6/8	21.6	49 1/8	26.1
22 3/8	3.9	27 6/8	8.4	33 1/8	12.8	38 4/8	17.3	43 7/8	21.7		
22 4/8	4.0	27 7/8	8.5	33 2/8	12.9	38 5/8	17.4	44 0/8	21.8		
22 5/8	4.1	28 0/8	8.6	33 3/8	13.0	38 6/8	17.5	44 1/8	21.9		
22 6/8	4.2	28 1/8	8.7	33 4/8	13.1	38 7/8	17.6	44 2/8	22.0		
22 7/8	4.3	28 2/8	8.8	33 5/8	13.2	39 0/8	17.7	44 3/8	22.1		

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TABLE II  
PERCENT FAT PREDICTION IN WOMEN

NECK	PTS	NECK	PTS	NECK	PTS	NECK	PTS	NECK	PTS
15 5/8	.1	13 7/8	4.1	12 1/8	8.0	10 3/8	11.9	8 5/8	15.8
15 4/8	.4	13 6/8	4.3	12 0/8	8.2	10 2/8	12.1	8 4/8	16.1
15 3/8	.7	13 5/8	4.6	11 7/8	8.5	10 1/8	12.4	8 3/8	16.3
15 2/8	1.0	13 4/8	4.9	11 6/8	8.8	10 0/8	12.7	8 2/8	16.7
15 1/8	1.3	13 3/8	5.2	11 5/8	9.1	9 7/8	13.0	8 1/8	16.9
15 0/8	1.5	13 2/8	5.4	11 4/8	9.4	9 6/8	13.3	8 0/8	17.2
14 7/8	1.8	13 1/8	5.7	11 3/8	9.6	9 5/8	13.5	7 7/8	17.4
14 6/8	2.1	13 0/8	6.0	11 2/8	9.9	9 4/8	13.8	7 6/8	17.7
14 5/8	2.4	12 7/8	6.3	11 1/8	10.2	9 3/8	14.1	7 5/8	18.0
14 4/8	2.7	12 6/8	6.6	11 0/8	10.6	9 2/8	14.4	7 4/8	18.3
14 3/8	2.9	12 5/8	6.8	10 7/8	10.9	9 1/8	14.7	7 3/8	18.6
14 2/8	3.2	12 4/8	7.1	10 6/8	11.0	9 0/8	14.9		
14 1/8	3.5	12 3/8	7.4	10 5/8	11.3	8 7/8	15.2		
14 0/8	3.8	12 2/8	7.7	10 4/8	11.6	8 6/8	15.5		
BICEPS	PTS	BICEPS	PTS	BICEPS	PTS	BICEPS	PTS	BICEPS	PTS
5 7/8	.1	7 5/8	4.8	9 3/8	9.4	11 1/8	14.1	12 7/8	18.8
6 0/8	.4	7 6/8	5.1	9 4/8	9.8	11 2/8	14.5	13 0/8	19.1
6 1/8	.8	7 7/8	5.4	9 5/8	10.1	11 3/8	14.8	13 1/8	19.5
6 2/8	1.1	8 0/8	5.8	9 6/8	10.4	11 4/8	15.1	13 2/8	19.8
6 3/8	1.4	8 1/8	6.1	9 7/8	10.8	11 5/8	15.5	13 3/8	20.1
6 4/8	1.8	8 2/8	6.4	10 0/8	11.1	11 6/8	15.8	13 4/8	20.5
6 5/8	2.1	8 3/8	6.8	10 1/8	11.4	11 7/8	16.1	13 5/8	20.8
6 6/8	2.4	8 4/8	7.1	10 2/8	11.8	12 0/8	16.5	13 6/8	21.1
6 7/8	2.8	8 5/8	7.4	10 3/8	12.1	12 1/8	16.8		
7 0/8	3.1	8 6/8	7.8	10 4/8	12.4	12 2/8	17.1		
7 1/8	3.4	8 7/8	8.1	10 5/8	12.8	12 3/8	17.5		
7 2/8	3.8	9 0/8	8.4	10 6/8	13.1	12 4/8	17.8		
7 3/8	4.1	9 1/8	8.8	10 7/8	13.5	12 5/8	18.1		
7 4/8	4.4	9 2/8	9.1	11 0/8	13.8	12 6/8	18.5		
FOREARM	PTS	FOREARM	PTS	FOREARM	PTS	FOREARM	PTS	FOREARM	PTS
17 5/8	.2	15 2/8	9.3	12 7/8	18.5	10 4/8	27.7	8 1/8	36.8
17 4/8	.6	15 1/8	9.6	12 6/8	18.0	10 3/8	28.1	8 0/8	37.3
17 3/8	1.1	15 0/8	10.1	12 5/8	19.5	10 2/8	28.5	7 7/8	37.8
17 2/8	1.6	14 7/8	10.8	12 4/8	19.9	10 1/8	29.1	7 6/8	38.3
17 1/8	2.1	14 6/8	11.2	12 3/8	20.4	10 0/8	29.6	7 5/8	38.8
17 0/8	2.5	14 5/8	11.7	12 2/8	20.9	9 7/8	30.1	7 4/8	39.3
16 7/8	3.0	14 4/8	12.2	12 1/8	21.4	9 6/8	30.6	7 3/8	39.7
16 6/8	3.5	14 3/8	12.7	12 0/8	21.9	9 5/8	31.0	7 2/8	40.2
16 5/8	4.0	14 2/8	13.2	11 7/8	22.3	9 4/8	31.5	7 1/8	40.7
16 4/8	4.5	14 1/8	13.7	11 6/8	22.8	9 3/8	32.0	7 0/8	41.2
16 3/8	5.0	14 0/8	14.1	11 5/8	23.3	9 2/8	32.5	6 7/8	41.7
16 2/8	5.4	13 7/8	14.6	11 4/8	23.8	9 1/8	33.0	6 6/8	42.2
16 1/8	5.9	13 6/8	15.1	11 3/8	24.3	9 0/8	33.5	6 5/8	42.5
16 0/8	6.4	13 5/8	15.6	11 2/8	24.8	8 7/8	33.9	6 4/8	42.8
15 7/8	6.9	13 4/8	16.1	11 1/8	25.3	8 6/8	34.4	6 3/8	43.1
15 6/8	7.4	13 3/8	16.6	11 0/8	25.7	8 5/8	34.9	6 2/8	43.4
15 5/8	7.9	13 2/8	17.0	10 7/8	26.2	8 4/8	35.4	6 1/8	43.7
15 4/8	8.3	13 1/8	17.5	10 6/8	26.7	8 3/8	35.9	6 0/8	44.0
15 3/8	8.8	13 0/8	18.0	10 5/8	27.2	8 2/8	36.4		

APPENDIX B

NAS PENSACOLA INSTRUCTION 6100.1A  
OF 27 MAY 1982



DEPARTMENT OF THE NAVY

COMMANDING OFFICER  
NAVAL AIR STATION  
PENSACOLA, FLORIDA 32304

IN REPLY REFER TO

NASPNCLAINST 6100.1A  
Code 22000

27 MAY 1982

NASPNCLA INSTRUCTION 6100.1A

From: Commanding Officer, Naval Air Station, Pensacola, Florida

Subj: Health and Physical Readiness Program

Ref: (a) OPNAVINST 6110.18  
(b) MILPERSHAN 3420440  
(c) SECNAVINST 1920.6  
(d) BUPERSINST 1430.16A

Encl: (1) Physical Readiness Classification Table and Test Requirements  
(2) Description of Test Items  
(3) Height-Weight Screening Tables  
(4) Landmarks for Percent Fat Measurements  
(5) Table I - Percent Fat Prediction in Men  
(6) Table II - Percent Fat Prediction in Women  
(7) Letter of Notification and Enrollment in Fitness for Life Program, NASP 6100/5  
(8) Sample Page Thirteen Service Record Entries  
(9) Fitness for Life Program Individual Progress Record, NASP 6100/6  
(10) Department Physical Readiness Test Record, NASP 6100/10  
(11) Individual Physical Readiness Test Record, NASP 6100/8  
(12) Medical Waiver for Navy Physical Readiness Testing Program, NASP 6100/14  
(13) Pre-Physical Readiness Testing Questionnaire, NASP 6100/11  
(14) Fitness for Life Medical Officer Progress Report, NASP 6100/12  
(15) Fitness for Life Workout Excuse - Memorandum, NASP 6100/13

1. Purpose. To implement a health and physical readiness program for Navy personnel that will establish the minimum criteria for physical fitness, provide guidance for meeting minimum standards, emphasize the need for all personnel to show concern for and participate in personal life style enhancing activities, and meet the requirements of reference (a).

2. Cancellation. NASPNCLA Instruction 6100.1 and 6100.58

3. Background. The Navy is no less susceptible to the insidious effects of sedentary jobs, excessive caloric intake, and lack of proper exercise than the civilian community. Excess body fat is a serious detriment to health, longevity, stamina, and military appearance. The need to maintain a high state of health and physical readiness throughout the naval service is essential to ensure combat readiness and personal effectiveness.

4. Program Description. A three level program has been designed to develop and maintain the health and physical fitness of all naval personnel. Level I, where the major emphasis is placed, promotes vigorous and active health and fitness programs which include the annual physical readiness testing of all personnel.

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and the command Fitness for Life program. Level II provides an educational program to improve lifestyles for those who do not meet the Navy's fitness/body fat standards and who want to change long established health habits. Level II includes Counseling and Assistance Center (CAAC) nonresidential counseling and affiliation with local Overeaters Anonymous groups in addition to continuance of the Fitness for Life Program. Level III provides residential treatment for members who have been clinically evaluated and medically diagnosed as compulsive overeaters and, in the opinion of their commanding officer, have potential for continued naval service. Length of treatment is normally six weeks and is provided at Alcohol Rehabilitation Centers.

5. Policy. All members of the Navy, except those excused for medical reasons, shall attain and maintain a condition of health and physical readiness consistent with their duties and, at a minimum, to the degree required in enclosure (1). Personnel shall be evaluated against the standards in enclosure (1) annually. Effective 1 October 1983, performance in the physical readiness test, or failure to show progress in meeting minimum physical readiness test standards, when there are no medically limiting circumstances, shall be included in the narrative sections of enlisted evaluations and officer fitness reports. It is imperative that this information be included in all transfer evaluations. Mandatory participation in the Fitness for Life Program will be required for those who fall below minimum physical readiness standards as outlined in enclosure (1). Continued failure through a six month time frame to show progress in meeting minimum Navy physical readiness standards, when there are no medically limiting circumstances, shall result in consideration for an administrative separation. Retention of those who fail to show progress in meeting minimum Navy physical readiness standards will be based on a recommendation by the Commanding Officer. Ultimate determination of satisfactory progress will be made by Commander, Naval Military Personnel Command (COMNAVMILPERSCOM) acting for the Chief of Naval Personnel. Reference (d) provides information regarding requirements to meet weight standards prior to advancement in rate. References (b) and (c) contain administrative procedures for processing enlisted personnel and officers respectively for separation by reason of obesity.

6. Responsibility

a. The individual shall:

(1) Achieve and maintain a fitness level equal to, or above, prescribed minimum standards.

(2) Take physical readiness tests when scheduled, unless excused by proper medical authority.

b. The NAS Pensacola Command Fitness Coordinator shall:

(1) Advise the Commanding Officer in all health and physical readiness program matters.

(2) Advise the internal chain of command in all health and physical readiness program matters; particularly with regard to individuals who need assistance in meeting minimum physical readiness standards.

(3) Ensure proper supervision and administration of all physical readiness tests.

(4) Counsel individuals who need assistance in meeting minimum physical readiness standards.

(5) Plan and supervise the mandatory fitness for life program.

(6) Prepare documentation of NAS Pensacola command physical readiness test results for higher authority.

(7) Coordinate emergency medical support during physical readiness testing with the Medical Officer.

(8) Ensure medical screening of all personnel prior to physical readiness testing on an annual basis using enclosure (13).

(9) Refer for medical evaluation those personnel over 40 years of age or those personnel with existing medical conditions which might interfere with their ability to complete the total testing requirement. Documentation of medical evaluation provided on enclosure (12).

c. Department Heads/Special Assistants shall:

(1) Appoint Department Fitness Coordinators who will coordinate all department programs with the NAS Pensacola Fitness Coordinator.

(2) Screen assigned personnel to determine those who need assistance in meeting minimum physical readiness standards and/or those who present an unsuitable military appearance for assignment to the mandatory Fitness for Life Program. Enclosure (7) shall be utilized for individual notification of medical screening.

(3) Provide the leadership to stimulate and promote increased levels of health and physical fitness for all personnel.

d. Military Support Officer shall ensure that appropriate service record (page 13) entries are made for assignment to and release from the mandatory Fitness for Life Program and medical waivers for nonparticipation as outlined in enclosure (8). Input received from enclosures (12) and (14) is to be used in making subject service record entries.

e. Medical Officer shall:

(1) Evaluate all personnel referred for medical screening by the NAS Pensacola Fitness Coordinator and/or Division Officers, and document the evaluation on enclosure (12).

(2) Provide diet and nutritional counseling to individuals assigned to the mandatory Fitness for Life Program.

(3) Document progress of individuals in the mandatory Fitness for Life Program on enclosure (2) through weekly measurements of body fat percentage.

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f. Supply Officer shall:

(1) Ensure that in coordination with the Medical Dietitian, that a selection of suitable diet foods are included in the enlisted mess menu, with such foods marked in a manner making them easily recognizable as such.

(2) Ensure that main entree items in the enlisted mess are labeled according to their individual portion caloric value.

g. Counseling and Assistance Officer shall:

(1) Provide and schedule behavior modification/reality therapy counseling for individuals recommended for Level II by the Commanding Officer, NAS Pensacola.

(2) Coordinate individual contact with local Overeaters Anonymous groups and monitor their attendance and progress.

7. Procedures concerning the Fitness for Life Program

a. In addition to weekly percent body fat verification with the Medical Officer, the Fitness for Life Program provides structured, supervised workouts three times a week from 1115-1145 at the Recreation Center, Building 632.

b. Personnel assigned to the program as a mandatory measure are required to muster for all workouts. Two unauthorized absences will result in disciplinary action being taken. Absence from workouts must be verified in writing from the division officer or division chief to the NAS Pensacola Fitness Coordinator by use of enclosure (15) within five working days of actual absence.

c. Personnel placed in a mandatory program for failure to meet minimum physical readiness standards will be granted a six-month conditioning time in Level I in order to achieve minimum standards. If successful progress is not made in that time frame, the Commanding Officer, based on input from the individual's Department Head/Division Officer, NAS Pensacola Fitness Coordinator, and the Medical Officer will determine if the individual is to be retained or recommended for administrative separation. If retention is recommended, the individual will be placed in Level II CAAC counseling for an additional 6 month period which includes a continuance of all aspects of the Level I program. In extreme cases, recommendation may be made directly to Level III. The program levels need not run consecutively. Program level will be determined according to the needs of the individual as evaluated by the Medical Officer and the NAS Pensacola Fitness Coordinator in recommendation to the Commanding Officer.

d. Department Fitness Coordinators shall utilize enclosure (13) for pre-physical readiness testing screening. Any individual marking yes to any question must be referred via the NAS Pensacola Fitness Coordinator to the Medical Officer for further evaluation. Department Fitness Coordinators will hold completed enclosure (13) forms on file for twelve months.

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e. Department Fitness Coordinators will utilize enclosure (11) for individual testing and compile division/department reports for the NAS Pensacola Fitness Coordinator using enclosure (10).

f. The health and physical readiness test will be administered the last Friday of every month from 1100-1200 in the Recreation Center, Building 632, for new personnel and those requiring make up testing.

8. Forms listed below may be obtained from NAS Administration, Code ADAP:

- a. LETTER OF NOTIFICATION AND ENROLLMENT IN FITNESS FOR LIFE PROGRAM, NASP 6100/5
- b. FITNESS FOR LIFE PROGRAM INDIVIDUAL PROGRESS RECORD, NASP 6100/6
- c. DEPARTMENT PHYSICAL READINESS TEST RECORD, NASP 6100/10
- d. INDIVIDUAL PHYSICAL READINESS TEST RECORD, NASP 6100/8
- e. MEDICAL WAIVER FOR NAVY PHYSICAL READINESS TESTING PROGRAM, NASP 6100/14
- f. PRE-PHYSICAL READINESS TESTING QUESTIONNAIRE, NASP 6100/11
- g. FITNESS FOR LIFE MEDICAL OFFICER PROGRESS REPORT, NASP 6100/12
- h. FITNESS FOR LIFE WORKOUT EXCUSE - MEMORANDUM, NASP 6100/13

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Distribution:  
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PHYSICAL READINESS CLASSIFICATION TABLE AND TEST REQUIREMENTS

	Under 30	30-34	35-39	40-44	45-49	50 & Older
CLASSIFICATION TEST	MEN WOMEN	MEN WOMEN	MEN WOMEN	MEN WOMEN	MEN WOMEN	MEN WOMEN
OUTSTANDING						
1.5 mi RUN	9:45 14:30	10:00 12:00	10:30 12:30	11:00 13:00	11:30 13:30	12:00 14:00
SIT UPS	100 84	90 75	85 71	80 67	80 67	80 67
SIT REACH	0.20 0.40	0.20 0.35	0.15 0.30	0.15 0.10	0.10 0.20	0.10 0.20
PERCENT FAT	14 18	14 18	14 18	14 18	14 18	14 18
EXCELLENT						
1.5 mi RUN	10:45 13:00	11:00 13:30	11:30 14:00	12:00 14:30	12:30 15:00	13:00 15:30
SIT UPS	75 61	68 56	64 51	60 50	60 50	60 50
SIT REACH	0.10 0.10	0 0.20	0 0.15	0 0.10	0.05 0.10	0.05 0.10
PERCENT FAT	16 22	16 22	16 22	16 22	16 22	16 22
GOOD						
1.5 mi RUN	11:00 15:00	14:00 15:30	14:30 16:00	15:00 16:30	15:30 17:00	16:00 17:30
RUN IN PLACE	150 300	325 200	300 200	300 200	200 200	200 200
SIT UPS	50 42	45 38	41 36	40 34	40 34	40 34
SIT REACH	0 0.20	-1.0 0	-1.0 0	-1.0 0	-1.0 0	-1.0 0
PERCENT FAT	18 24	18 24	18 24	18 24	18 24	18 24
SAFELY ADEQUATE						
1.5 mi RUN	14:30 16:30	15:30 17:30	16:00 18:00	16:30 18:30	17:00 19:00	17:30 20:00
RUN IN PLACE	110 240	200 220	210 200	210 200	210 200	210 200
SIT UPS	36 30	31 28	27 26	30 25	30 25	30 25
SIT REACH	1.0 0	-1.5 0.5	-1.5 1.0	-1.5 1.0	-2.0 1.5	-2.0 1.5
PERCENT FAT	20 29	20 29	20 29	20 29	20 29	20 29
MINIMUM						
STANDARD						
1.5 mi RUN	15:00 17:00	16:00 18:00	16:30 18:30	17:00 19:00	17:30 19:30	18:00 20:00
RUN IN PLACE	100 215	200 200	230 180	240 180	240 160	240 160
SIT UPS	31 27	31 25	29 23	27 22	27 22	27 22
SIT REACH	1.5 0.5	-2.0 1.0	-2.0 1.5	-2.0 1.5	-2.5 2.0	-2.5 2.0
PERCENT FAT	22 30	22 30	22 30	22 30	22 30	22 30

Classification Criteria: Only one classification applies to an individual and each individual must meet or exceed each and every criterion to achieve the classification.

Enclosure (2)



# DESCRIPTION OF TEST ITEMS

## 1. Stamina and cardiorespiratory endurance\*

a. Definition. The ability to persist in physical activity which demands the delivery and utilization of large amounts of oxygen.

b. 1.5 mile run-walk test. A course of 1.5 miles should be selected which is relatively free of steep inclines, surface irregularities and sharp turns. Any combination of running or walking is permitted to achieve the best time. Performances should be recorded with a stopwatch to the nearest second.

c. Run in place. May be substituted for timed distance run or walk on an individual basis whenever desired or on a unit basis where circumstances make it appropriate to do so. Run in place cannot be used to qualify for the excellent or outstanding category. The test consists of running in place with knees up and feet raised approximately 8 inches off the deck on each step. A count is made every time the left foot hits the deck. The score is the number of counts completed in three minutes.

## 2. Strength and muscular endurance\*

a. Definition. The maximum force that can be exerted in a single voluntary contraction and the ability to continue contracting a muscle or muscle group without fatigue.

### b. Sit ups

(1) Lie flat on back with knees bent, heels approximately 10 inches from buttocks, and arms folded across chest and feet held to floor by a partner.

(2) Curl up touching elbows to thighs.

(3) Lie back touching shoulder blades to floor.

(4) Repeat as many times as possible in two minutes. Timing begins with "Ready," "Begin." All personnel will be tested simultaneously.

(5) Caution. It is advisable to use a blanket or other suitable padding to prevent injuries.

\*Training Effect. Exercise, when conducted with sufficient regularity, intensity, and duration, that results in improvement in the efficiency of the cardiorespiratory system and/or muscular strength and endurance. It is generally held that exercise that produces a training effect must be conducted a minimum of three times per week, preferably on alternate days, raises the member's heart rate to 50-80 percent of maximum for his or her age, and maintains the heart rate at that elevated level for 20-30 minutes.

Enclosure (2)

- (1) The neck measurement is taken at a point just below the larynx (Adam's apple).
- (2) The abdomen measurement is taken at the navel, level to the deck.
- (3) Enter the table with the above measures to find the percent body fat.

g. Enclosure (7) is used to estimate a woman's percent body fat.

- (1) The neck measurement is taken at a point just below the larynx (Adam's apple).
- (2) The abdomen measurement is taken at the navel, level to the deck.
- (3) The biceps measurement is taken with the left arm fully extended, level to the deck with the palm facing up. Place the tape over the largest circumference of the bicep-tricep muscle groups (upper arm).
- (4) The forearm measurement is taken with the left arm fully extended, level to the deck with the palm facing up. Place the tape over the largest circumference of the forearm.
- (5) The thigh measurement is taken with the feet slightly apart. Place the tape just below the left buttock, around the thigh level to the deck.
- (6) Convert all measurements to fat percentage points using Table II. Add the five percentage points. Subtract a correction factor of 54.598 from the total. The difference is the percent fat.

h. All percent fat values should be reported to the nearest tenth of one percent.

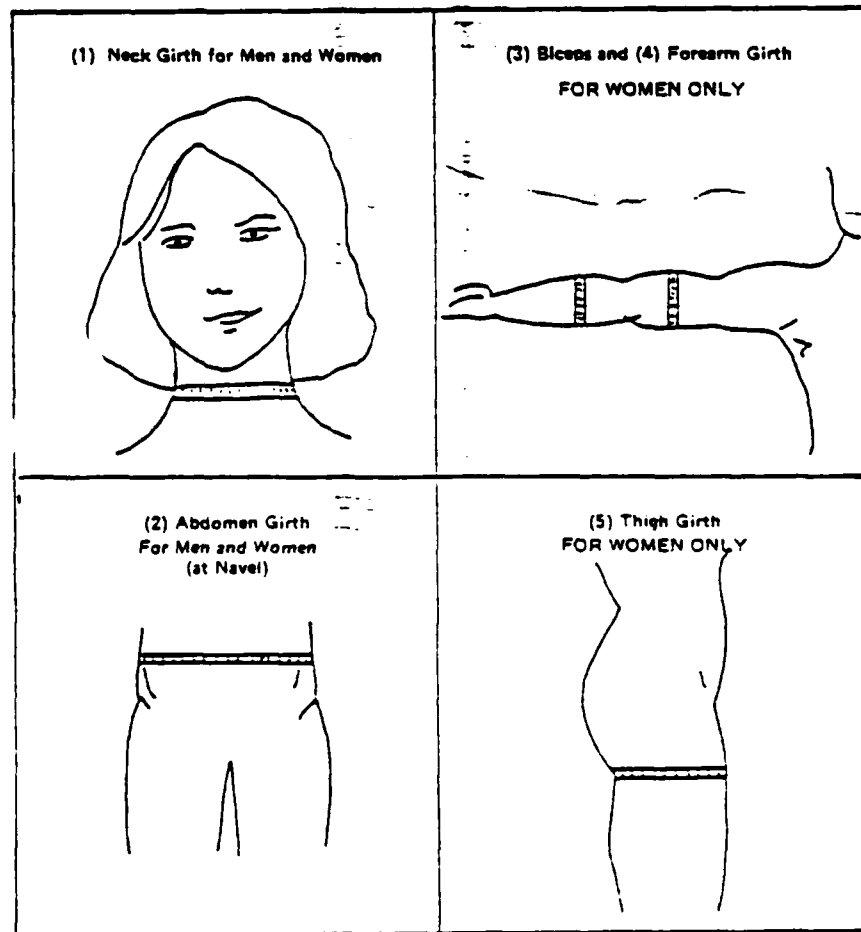
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HEIGHT-WEIGHT SCREENING TABLES

HEIGHT	MEN		WOMEN	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
4' 10"			87	126
4' 11"			89	128
5' 0"	100	153	92	130
5' 1"	102	155	95	132
5' 2"	103	158	97	134
5' 3"	104	160	100	136
5' 4"	105	164	103	139
5' 5"	106	169	106	144
5' 6"	109	174	108	148
5' 7"	111	179	111	152
5' 8"	115	184	114	156
5' 9"	119	189	117	161
5' 10"	123	194	119	165
5' 11"	127	199	122	169
6' 0"	131	205	125	174
6' 1"	135	211	128	179
6' 2"	139	218	130	185
6' 3"	143	224	133	190
6' 4"	147	230	136	196
6' 5"	151	236	139	201
6' 6"	153	242	141	206
6' 7"	157	248	144	211
6' 8"	161	254	147	216

Enclosure (3)

# LANDMARKS FOR PERCENT FAT MEASUREMENTS



See Enclosure (2) for complete directions on taking of measurements.

Enclosure (2)

TABLE I

## PERCENT FAT PREDICTION IN MEN FROM ABDOMEN AND NECK MEASUREMENTS

Abdomen (cm)	Neck (cm)	Percent Fat
100	35	10.0
100	36	10.5
100	37	11.0
100	38	11.5
100	39	12.0
100	40	12.5
100	41	13.0
100	42	13.5
100	43	14.0
100	44	14.5
100	45	15.0
100	46	15.5
100	47	16.0
100	48	16.5
100	49	17.0
100	50	17.5
100	51	18.0
100	52	18.5
100	53	19.0
100	54	19.5
100	55	20.0
100	56	20.5
100	57	21.0
100	58	21.5
100	59	22.0
100	60	22.5
100	61	23.0
100	62	23.5
100	63	24.0
100	64	24.5
100	65	25.0
100	66	25.5
100	67	26.0
100	68	26.5
100	69	27.0
100	70	27.5
100	71	28.0
100	72	28.5
100	73	29.0
100	74	29.5
100	75	30.0
100	76	30.5
100	77	31.0
100	78	31.5
100	79	32.0
100	80	32.5
100	81	33.0
100	82	33.5
100	83	34.0
100	84	34.5
100	85	35.0
100	86	35.5
100	87	36.0
100	88	36.5
100	89	37.0
100	90	37.5
100	91	38.0
100	92	38.5
100	93	39.0
100	94	39.5
100	95	40.0
100	96	40.5
100	97	41.0
100	98	41.5
100	99	42.0
100	100	42.5
101	35	10.2
101	36	10.7
101	37	11.2
101	38	11.7
101	39	12.2
101	40	12.7
101	41	13.2
101	42	13.7
101	43	14.2
101	44	14.7
101	45	15.2
101	46	15.7
101	47	16.2
101	48	16.7
101	49	17.2
101	50	17.7
101	51	18.2
101	52	18.7
101	53	19.2
101	54	19.7
101	55	20.2
101	56	20.7
101	57	21.2
101	58	21.7
101	59	22.2
101	60	22.7
101	61	23.2
101	62	23.7
101	63	24.2
101	64	24.7
101	65	25.2
101	66	25.7
101	67	26.2
101	68	26.7
101	69	27.2
101	70	27.7
101	71	28.2
101	72	28.7
101	73	29.2
101	74	29.7
101	75	30.2
101	76	30.7
101	77	31.2
101	78	31.7
101	79	32.2
101	80	32.7
101	81	33.2
101	82	33.7
101	83	34.2
101	84	34.7
101	85	35.2
101	86	35.7
101	87	36.2
101	88	36.7
101	89	37.2
101	90	37.7
101	91	38.2
101	92	38.7
101	93	39.2
101	94	39.7
101	95	40.2
101	96	40.7
101	97	41.2
101	98	41.7
101	99	42.2
101	100	42.7
102	35	10.4
102	36	10.9
102	37	11.4
102	38	11.9
102	39	12.4
102	40	12.9
102	41	13.4
102	42	13.9
102	43	14.4
102	44	14.9
102	45	15.4
102	46	15.9
102	47	16.4
102	48	16.9
102	49	17.4
102	50	17.9
102	51	18.4
102	52	18.9
102	53	19.4
102	54	19.9
102	55	20.4
102	56	20.9
102	57	21.4
102	58	21.9
102	59	22.4
102	60	22.9
102	61	23.4
102	62	23.9
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102	64	24.9
102	65	25.4
102	66	25.9
102	67	26.4
102	68	26.9
102	69	27.4
102	70	27.9
102	71	28.4
102	72	28.9
102	73	29.4
102	74	29.9
102	75	30.4
102	76	30.9
102	77	31.4
102	78	31.9
102	79	32.4
102	80	32.9
102	81	33.4
102	82	33.9
102	83	34.4
102	84	34.9
102	85	35.4
102	86	35.9
102	87	36.4
102	88	36.9
102	89	37.4
102	90	37.9
102	91	38.4
102	92	38.9
102	93	39.4
102	94	39.9
102	95	40.4
102	96	40.9
102	97	41.4
102	98	41.9
102	99	42.4
102	100	42.9
103	35	10.6
103	36	11.1
103	37	11.6
103	38	12.1
103	39	12.6
103	40	13.1
103	41	13.6
103	42	14.1
103	43	14.6
103	44	15.1
103	45	15.6
103	46	16.1
103	47	16.6
103	48	17.1
103	49	17.6
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103	55	20.6
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103	57	21.6
103	58	22.1
103	59	22.6
103	60	23.1
103	61	23.6
103	62	24.1
103	63	24.6
103	64	25.1
103	65	25.6
103	66	26.1
103	67	26.6
103	68	27.1
103	69	27.6
103	70	28.1
103	71	28.6
103	72	29.1
103	73	29.6
103	74	30.1
103	75	30.6
103	76	31.1
103	77	31.6
103	78	32.1
103	79	32.6
103	80	33.1
103	81	33.6
103	82	34.1
103	83	34.6
103	84	35.1
103	85	35.6
103	86	36.1
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103	93	39.6
103	94	40.1
103	95	40.6
103	96	41.1
103	97	41.6
103	98	42.1
103	99	42.6
103	100	43.1
104	35	10.8
104	36	11.3
104	37	11.8
104	38	12.3
104	39	12.8
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104	42	14.3
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104	95	40.8
104	96	41.3
104	97	41.8
104	98	42.3
104	99	42.8
104	100	43.3
105	35	11.0
105	36	11.5
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105	38	12.5
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105	40	13.5
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105	42	14.5
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105	50	18.5
105	51	19.0
105	52	19.5
105	53	20.0
105	54	20.5
105	55	21.0
105	56	21.5
105	57	22.0
105	58	22.5
105	59	23.0
105	60	23.5
105	61	24.0
105	62	24.5
105	63	25.0
105	64	25.5
105	65	26.0
105	66	26.5
105	67	27.0
105	68	27.5
105	69	28.0
105	70	28.5
105	71	29.0
105	72	29.5
105	73	30.0
105	74	30.5
105	75	31.0
105	76	31.5
105	77	32.0
105	78	32.5
105	79	33.0
105	80	33.5
105	81	34.0
105	82	34.5
105	83	35.0
105	84	35.5
105	85	36.0
105	86	36.5
105	87	37.0
105	88	37.5
105	89	38.0
105	90	38.5
105	91	39.0
105	92	39.5
105	93	40.0
105	94	40.5
105	95	41.0
105	96	41.5
105	97	42.0
105	98	42.5
105	99	43.0
105	100	43.5

Abdomen (cm)	Neck (cm)	Percent Fat
106	35	11.2
106	36	11.7
106	37	12.2
106	38	12.7
106	39	13.2
106	40	13.7
106	41	14.2
106	42	14.7
106	43	15.2
106	44	15.7
106	45	16.2
106	46	16.7
106	47	17.2
106	48	17.7
106	49	18.2
106	50	18.7
106	51	19.2
106	52	19.7
106	53	20.2
106	54	20.7
106	55	21.2
106	56	21.7
106	57	22.2
106	58	22.7
106	59	23.2
106	60	23.7
106	61	24.2
106	62	24.7
106	63	25.2
106	64	25.7
106	65	26.2
106	66	26.7
106	67	27.2
106	68	27.7
106	69	28.2
106	70	28.7
106	71	29.2
106	72	29.7
106	73	30.2
106	74	30.7
106	75	31.2
106	76	31.7
106	77	32.2
106	78	32.7
106	79	33.2
106	80	33.7
106	81	34.2
106	82	34.7
106	83	35.2
106	84	35.7
106	85	36.2
106	86	36.7
106	87	37.2
106	88	37.7
106	89	38.2
106	90	38.7
106	91	39.2
106	92	39.7
106	93	40.2
106	94	40.7
106	95	41.2
106	96	41.7
106	97	42.2
106	98	42.7
106	99	43.2
106	100	43.7
106	101	44.2
106	102	44.7
106	103	45.2
106	104	45.7
106	105	46.2
106	106	46.7
106	107	47.2
106	108	47.7
106	109	48.2
106	110	48.7
106	111	49.2
106	112	49.7
106	113	50.2
106	114	50.7
106	115	51.2
106	116	51.7
106	117	52.2
106	118	52.7
106	119	53.2
106	120	53.7
106	121	54.2
106	122	54.7
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106	129	58.2
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106	133	60.2
106	134	60.7
106	135	61.2
106	136	61.7
106	137	62.2
106	138	62.7
106	139	63.2
106	140	63.7
106	141	64.2
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106	143	65.2
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106	145	66.2
106	146	66.7
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106	213	100.2
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106	216	101.7
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106	234	110.7
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106	236	111.7
106	237	112.2
106	238	112.7
106	239	113.2
106	240	113.7
106	241	114.2
106	242	114.7
106	243	115.2
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106	254	120.7
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106	270	128.7
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106	287	137.2
106	288	137.7
106	289	138.2
106	290	138.7
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106	292	139.7
106	293	140.2
106	294	140.7
106	295	141.2
106	296	141.7
106	297	142.2
106	298	142.7
106	299	143.2
106	300	143.7
106	301	144.2
106	302	144.7
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106	306	146.7
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106	308	147.7
106	309	148.2
106	310	148.7
106	311	149.2
106	312	149.7
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106	318	152.7
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106	320	153.7
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106	420	203.7
106	421	204.2
106	422	204.7
106	423	205.2
106	424	205.7
106	425	206.2
106	426	206.7
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106	428	207.7
106	429	208.2
106	430	208.7
106	431	209.2
106	432	209.7
106	433	210.2
106	434	210.7
106	435	211.2
106	436	211.7
106	437	212.2
106	438	212.7
106	439	213.2
106	440	213.7
106	441	214.2
106	442	214.7
106	443	215.2
106	444	215.7
106	445	216.2
106	446	216.7
106	447	217.2
106	448	217.7
106	449	218.2
106	450	218.7
106	451	219.2
106	452	219.7
106	453	220.2
106	454	220.7

TABLE II

**Appendix (6)**

NAVAL AIR STATION  
PENSACOLA, FLORIDA

DATE: \_\_\_\_\_

MEMORANDUM

From: \_\_\_\_\_ Division Officer/Department Head

To: \_\_\_\_\_

Subj: Assignment to Fitness for Life Program

Ref: (a) NASPNCLAINST 6100.1A

1. Because of your physical appearance and/or failure in physical readiness testing, you have been identified as not meeting minimum physical readiness standards as outlined in reference (a). In accordance with reference (a), you are directed to report to the NASP Branch Clinic at the following date and time in order to be evaluated by a Medical Officer.

Date: \* \_\_\_\_\_

Time: \* \_\_\_\_\_

\_\_\_\_\_  
(Signature)

\* Note to Division Officers: Date and time can be prearranged with the sick call section of the Branch Clinic by calling 2-3494; however, patients may be seen during normal sick call hours Monday thru Friday, 0700-1000 and 1230-1400, except Thursday afternoon. This form must accompany individual when reporting for evaluation.

Sample page 13 entries: -

Disqualified Physical Readiness

Date: \_\_\_\_\_

"I, (name of member), have been advised that I am deficient by current physical readiness standards due to dietary indiscretion and lack of physical exercise which is a condition not considered a physical disability and usually may be controlled by my strict adherence to the prescribed dietary control and exercise programs. I understand that I will receive a special physical examination during (month, year - to be six months from current date or date of placement on the Fitness for Life Program) and in the event the examination indicates that I have continued to demonstrate nonadherence to the proper program prescribed and/or my condition is considered such as to render me militarily not suitable, I may be administratively separated from the naval service for the convenience of the Government."

(Signature of member) \_\_\_\_\_

Removed from the Fitness for Life Program

Date: \_\_\_\_\_

CERTIFICATION: \_\_\_\_\_ has been removed from the Fitness for Life Program after achieving percent body fat and/or physical performance sufficient to attain the goals established.

Medical Waiver for Health and Physical Readiness Program

Date: \_\_\_\_\_

CERTIFICATION: \_\_\_\_\_ has been granted a waiver exempting them from the following physical readiness test items:

☐

SIT REACH TEST

☐

SIT UPS

☐

RUN IN PLACE

☐

1.5 MILE WALK/RUN

☐

MEASURING PERCENT FAT

This waiver is granted based on Medical Evaluation of \_\_\_\_\_ (Date)

Enclosure (8)





DEPARTMENT PHYSICAL READINESS TEST RECORD															
DEPARTMENT				DIVISION				DATE							
CLASSIFICATION: O - Outstanding    E - Excellent    G - Good    S - Satisfactory    N - Minimum															
NO.	NAME (Last, First, Middle Initial) (and "or" if female)	DATE NAME	SSN	AGE	HEIGHT	WEIGHT	ST REACH (to tip of toes)	ST LUNG	LAIS 1.5 MI RUN	LAIS 5 MI RUN	LAIS 10 MI RUN	LAIS 15 MI RUN	LAIS 20 MI RUN	LAIS 25 MI RUN	LAIS 30 MI RUN
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															
16.															
17.															
18.															
19.															
20.															
21.															
22.															
23.															
24.															
TEST ADMINISTERED AND RESULTS VERIFIED BY			NAME				TELEPHONE NO.								

NASR 6108/10 (5-83)

Enclosure (10)

INDIVIDUAL PHYSICAL READINESS TEST RECORD							
NAME (Last, First, Middle Initial)				SSN		DATE	
SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE		AGE (Years)		HEIGHT (Inches)		WEIGHT (Pounds)	
RANK/DESIGNATION		RATING		COMMAND/DEPARTMENT			
Classification Codes: O = Outstanding E = Excellent G = Good S = Satisfactory M = Minimum F = Fail							
TEST RESULTS							
1.5 MILE RUN		MINUTES		SECONDS		CLASSIFICATION	
SIT UPS		NUMBER COMPLETED IN TWO MINUTES				CLASSIFICATION	
SIT REACH		(To nearest 1/4 inch) <input type="checkbox"/> + <input type="checkbox"/> - INCHES				CLASSIFICATION	
PERCENT BODY FAT							
MALES		NECK (To nearest .25")		ABDOMEN (To nearest .5")		PERCENT BODY FAT	
						CLASSIFICATION	
FEMALES		ITEM	NECK	ABDOMEN	BICEP	FOREARM	THIGH
		INCHES (To nearest 1/8")					
		POINTS					
		TOTAL POINTS					
		MINUS CF				- 54.500	
		PERCENT BODY FAT					
OVERALL CLASSIFICATION							
Comments							

MEDICAL WAIVER FOR NAVY PHYSICAL READINESS TESTING PROGRAM					
FROM MEDICAL OFFICER/PHYSICIAN'S ASSISTANT				DATE	
COMMAND FITNESS COORDINATOR, NAVAL AIR STATION, PENSACOLA, FL					
NAME (LAST, FIRST, MIDDLE INITIAL)			RANK/RATE		SSN
COMMAND		DEPARTMENT		DIVISION	
PERCENT BODY FAT	HEIGHT	WEIGHT	MEETS MINIMUM BODY FAT STANDARD? <input type="checkbox"/> YES <input type="checkbox"/> NO		
I. EVALUATION/FINDINGS					
a. Capable of annual testing/Participation in all areas <span style="float: right;"><input type="checkbox"/> YES <input type="checkbox"/> NO</span> b. Not capable of annual testing in following areas (Check appropriate boxes): <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div><input type="checkbox"/> SIT REACH TEST</div> <div><input type="checkbox"/> SIT UPS</div> <div><input type="checkbox"/> RUN IN PLACE</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div><input type="checkbox"/> 1.5 MILE WALK/RUN</div> <div><input type="checkbox"/> MEASURING PERCENT FAT</div> <div>OTHER (Specify in comments)</div> </div>					
II. RECOMMENDATIONS					
a. Has been given guidance concerning physical conditioning program as follows (check appropriate boxes): <div style="margin-top: 10px;"> <input type="checkbox"/> TOTAL REST PRESCRIBED  <input type="checkbox"/> MODERATE ACTIVITY ALLOWED (Including walking and flexibility exercises)  <input type="checkbox"/> NON WEIGHT BEARING ACTIVITY ALLOWED (Including swimming, bicycling and flexibility exercises)                     </div> b. Has been counseled concerning the potential for weight gain during this period of reduced activity and instructed in the dietary measures for the prevention thereof.					
III. WAIVER RECOMMENDED					
<input type="checkbox"/> TEMPORARY (Period of less than 12 months) <input type="checkbox"/> PERMANENT (Period of 12 months or more) (Page 13 entry should be made for permanent waiver)					
IV. REEVALUATION					
<input type="checkbox"/> RECOMMENDED IN _____ MONTHS <input type="checkbox"/> REEVALUATION NOT WARRANTED					
COMMENTS					
SIGNATURE (Medical Officer/Physician's Assistant)				DATE	
COPY TO: DEPARTMENT HEAD/SPECIAL ASSISTANT MILITARY SUPPORT OFFICER					

NASPNCLAINST 6100.1A

Enclosure (12)

PRE-PHYSICAL READINESS TESTING QUESTIONNAIRE			
NAME	RANK/RATE	COMMAND	DATE
All questions must be answered. Check the appropriate column with an "X."			<div style="display: flex; justify-content: space-around;"> <span>YES</span> <span>NO</span> <span>DON'T KNOW</span> </div>
1. Has your doctor said you have heart trouble, a heart murmur, or have you had a heart attack?			
2. Do you frequently have pains or pressure - in the left or midchest area, left neck, shoulder or arm - during or right after you exercise?			
3. Do you often feel faint or have spells or severe dizziness?			
4. Do you experience extreme breathlessness after mild exertion?			
5. Has your doctor said your blood pressure was too high and is not under control? Or you don't know whether your blood pressure is normal?			
6. Has your doctor said you have bone or joint problems such as arthritis?			
7. Are you 40 or over and not accustomed to vigorous exercise?			
8. Have you a family history of premature coronary artery disease (heart attack or chest pain prior to age 50)?			
9. Do you have a medical condition not mentioned here which might need special attention in an exercise program (For example, insulin-dependent diabetes)? If "yes" please name your condition:			
Are you taking any prescribed medicine?			
11. If over 40, give date of last physical examination:			
12. OTHER PERTINENT INFORMATION			
SIGNATURE			
MEDICAL COMMENTS AND EVALUATION			
COMMENTS (ANY "YES" OR "DON'T KNOW" ANSWERS ABOVE REQUIRE COMMENT - OTHERWISE STATE NONE)			
SIGNATURE (Medical Officer/MDR)			
TO: NASP FITNESS COORDINATOR			
(RETAIN BY DEPARTMENT FITNESS COORDINATOR FOR 12 MONTHS IF ANY "YES" ANSWERS GIVEN)			

NASP 6100/11 (5-83)

Enclosure (13)

<b>NESS FOR LIFE</b>		
<b>MEDICAL OFFICER PROGRESS REPORT</b>		<b>NASPNCLAINST 6100.1A</b>
<b>FROM</b>	<b>DATE</b>	
<b>MEDICAL OFFICER</b>		
<b>TO</b>	<b>DEPARTMENT HEAD/SPECIAL ASSISTANT</b>	
<b>VIA</b>		
<b>NAS PENSACOLA FITNESS COORDINATOR</b>		
<b>NAME</b>	<b>RATE</b>	<b>SSN</b>
HAS ACHIEVED _____ PERCENT BODY FAT. THIS MEETS REQUIRED PHYSICAL READINESS STANDARDS AS DEFINED BY NAS PENSACOLA INSTRUCTION 6100.1A. RECOMMEND REMOVAL FROM THE MANDATORY FITNESS FOR LIFE PROGRAM.		
<b>SIGNATURE (Medical Officer)</b>		
<b>FIRST ENDORSEMENT</b>		
SUBJECT INDIVIDUAL HAS MADE PROGRESS IN FITNESS FOR LIFE PROGRAM AS FOLLOWS:		
<b>RECOMMENDATION</b>		
<input checked="" type="checkbox"/> REMOVAL FROM MANDATORY FITNESS FOR LIFE PROGRAM <input type="checkbox"/> RETENTION IN MANDATORY FITNESS FOR LIFE PROGRAM		
<b>COMMENTS</b>		
<b>SIGNATURE (NASP Fitness Coordinator)</b>		<b>DATE</b>
<b>COPY TO: MEMBER MILITARY SUPPORT OFFICE</b>		
<b>NOTE:</b> Individual must have approval from both Medical and the NAS Pensacola Fitness Coordinator in order to be officially released from the mandatory fitness for life program.		

3100/12 (5-83)

Enclosure (14)

NAVAL AIR STATION  
PENSACOLA, FL

Date: \_\_\_\_\_

MEMORANDUM

From: \_\_\_\_\_ Department/Division Officer/Chief  
To: NAS Pensacola Command Fitness Coordinator

Subj: Fitness for Life Workout Excuse

Ref: (a) NASPNCLAINST 6100.1A

1. In accordance with reference (a),

(Name)

(Rank)

(SSN)

is to be excused from the fitness for life workout on the following dates:

From: \_\_\_\_\_ To: \_\_\_\_\_

for the following reason(s): (Check appropriate boxes.)

- ☐ Duty      ☐ TAD      ☐ Leave      ☐ Medical  
☐ Other (Specify)

(Signature) \_\_\_\_\_

Title: \_\_\_\_\_

NASP 6100/13 (5-83)

Enclosure (15)

## APPENDIX C

### LETTER OF REQUEST TO CONDUCT RESEARCH

9 September 1985

From: Lieutenant Joyce A. Heflin, USN, 220-60-3837/1100  
To: Commanding Officer, Naval Air Station, Pensacola  
Via: (1) Superintendent, Naval Postgraduate School  
(2) Commander Naval Military Personnel Command (NMPC-6H)  
Subj: REQUEST TO CONDUCT THESIS RESEARCH ON THE IMPACT OF THE  
HEALTH AND PHYSICAL PROGRAM ON NAVAL AIR STATION PRODUCTIVITY  
AT PENSACOLA, FLORIDA  
Ref: (a) PHONCON NPS LT Heflin (Code 36) NASP XO CDR William C.  
Lawless of 6 Sep 85

1. Very respectfully request permission to conduct my thesis research at the Naval Air Station, Pensacola, FL. I wish to explore the impact that the Health and Physical Readiness Program had on NAS productivity during the MAR 83 - JUL 84 timeframe.
2. Reference (a) has established preliminary approval of this request.
3. My research requires access to archival data on fitness testing and productivity measures of the various departments. I plan to visit Pensacola 30 SEP 85 - 4 OCT 85 to collect this information. Collection of this data will present no operational burden to NASP.
4. This research study is supported by the Naval Postgraduate School and NMPC-6H.

*J. A. Heflin*  
J. A. HEFLIN  
LT USN

Copy to:  
CNET Pensacola, FL



APPENDIX D

FIRST ENDORSEMENT ON RESEARCH REQUEST



DEPARTMENT OF THE NAVY

NAVAL POSTGRADUATE SCHOOL  
MONTEREY CA 93943-5100

IN REPLY REFER TO

1550/1  
NC4(36)  
9 September 1985

FIRST ENDORSEMENT on LT Heflin ltr of 9 Sep 85

From: Superintendent, Naval Postgraduate School  
To: Commanding Officer, Naval Air Station, Pensacola

Subj: REQUEST TO CONDUCT THESIS RESEARCH ON THE IMPACT OF THE  
HEALTH AND PHYSICAL PROGRAM ON NAVAL AIR STATION PRODUCTIVITY  
AT PENSACOLA, FLORIDA

1. Forwarded recommending approval. The writing of a thesis is a required element in LT Heflin's Masters degree program at the Naval Postgraduate School. The theses produced by our graduate students frequently are of great value to the Navy. Your support for LT Heflin's thesis would be greatly appreciated.

  
F. B. KELLER  
By direction

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